



USER'S MANUAL FOR



TC-7-04

An Ordinance to Conserve Trees

IN THE CITY OF RALEIGH, NORTH CAROLINA

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4 The Value of Trees To The City of Raleigh

“To exist as a nation, to prosper as a state, and to live as people, we must have trees.” – Theodore Roosevelt

The following are some statistics on how important trees are to a community.

1. “One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people.” – U.S. Department of Agriculture
2. “During a 50-year life span, one tree will generate \$30,000 in oxygen, recycle \$35,000 worth of water, and clean up \$60,000 worth of air pollution or \$125,000 total per tree without including any other values.” USDA Forest Service
3. “Trees can boost the market value of your home by an average of 6 or 7 percent.” – Dr. Lowell Ponte
4. “The net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating 20 hours a day.” – U.S. Department of Agriculture
5. Trees help to cool cities by cooling urban heat sinks. Urban heat sinks are 6 – 19 degrees F warmer than their surroundings. – U.S. Department of Agriculture
6. “Healthy, mature trees add an average of 10 percent to a property’s value.” – USDA Forest Service
7. “Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent.” – The National Arbor Day Foundation
8. Research at the Universities of Iowa and Washington indicate that trees (e.g., poplars), and their symbionts can breakdown pesticides and carcinogenic groundwater contaminants, such as atrazine and trichloroethylene, into harmless compounds (Black,1995).

TC-7-04 / Text Change 7, 2004: An Ordinance To Conserve Trees— User’s Manual

Introduction: TC-7-04, the City of Raleigh’s tree conservation ordinance, is the final product of three years of intensive research and thoughtful work by the Tree Preservation Task Force. The Task Force, appointed by the Raleigh City Council in 2001, was comprised of land-use planners, developers, people with environmental interests, business people, and tree professionals. City staff, from the Planning and Inspections Departments, and the City Attorney’s office, worked with the Task Force. The ordinance underwent a public hearing as required by law, and subsequently underwent several revisions before it was adopted in January, 2005.

The adopted ordinance contains thirty-three sections, twenty-six of which are amendments to existing code. The amendments consist of new definitions, changes in the code to ensure adequate protection of the City’s tree resources, creation of a new regulation which governs removal of trees prior to development on lots two acres or larger, and creation of a new subsection—Establishment And Protection Of Tree Conservation Areas (10-2082.14). The different sections of the adopted text change are referenced throughout this manual.

Abbreviations used in this manual are as follows: TCA for Tree Conservation Area, and CRZ for Critical Root Zone. DBH for tree Diameter at Breast Height. DWQ for Division of Water Quality.

Active tree preservation: Arboricultural practices designed to ensure survival of existing trees by protection of *critical root zones* from *tree disturbing activities* and the application of arboricultural maintenance procedures, including but not limited to: watering, fertilizing, pruning of limbs, pruning of roots, and soil aeration. These practices must begin no later than at issuance of the grading permit, and continue for a minimum period of one year following construction. A tree preservation plan must be approved by the City's Forestry Specialist prior to the issue of the grading permit. (TC-7-04 Section 2)

Basal area: A measure of tree density used by foresters. It measures the total cross sectional area of tree trunks in square feet/acre in a wooded area. Basal area is understood to be expressed in square feet per acre (i.e. A stand of trees with a *basal area* of 100 means that the stand has a *basal area* of 100 square feet per acre). (TC-7-04 Section 1)

Basal area can be calculated from tree *dbh*. For more information about *basal area*, see the appendix. See Figure 1.

Caliper: The American Association of Nurserymen standard for trunk diameter measurement of nursery stock. *Caliper* is measured six inches above grade for trees up to 4 inches *caliper*, and measured 12 inches above grade for larger trees.

Certified arborist: A *certified arborist* is an individual who has passed an examination administered by the International Society Of Arboriculture (ISA) to certify knowledge of the planting and care of individual trees. A *certified arborist* typically specializes in the planting and care of landscape trees.

Champion Tree: The champion or co-champion tree of a given species: on the National Big Tree list, the Champion Big Trees of North Carolina list, or the Capital Trees Program list. A list of *Champion Trees* is in the appendix. (TC-7-04 Section 1)

City Forestry Specialist: The job position in the Zoning Division of the Inspections Department responsible for application of TC-7-04, the Tree Conservation Ordinance.

Critical Root Zone (CRZ): A protected circular area to remain undisturbed around a tree with a radius equal to 1.25 feet per 1 inch of tree *dbh* measured at 4 ½ feet above grade with the tree trunk at the center of the circle. (TC-7-04 reference Section 1)

- The *CRZ* must be completely protected where existing trees are preserved for credit to meet planting requirements in Resource Management Districts, Street Protective Yards, and Transition Protective Yards; and where a tree conservation permit is issued pursuant to 10-2082.14(f)(3). (TC-7-04 Sections 1, 6, 16)
- The *CRZ* must be completely protected where existing trees are preserved for credit to meet planting requirements in; Resource Management Districts, Street Protective Yards, and Transition Protective Yards; and where a tree conservation permit is issued pursuant to 10-2082.14(f)(3). (TC-7-04 Sections 1, 6, 16)

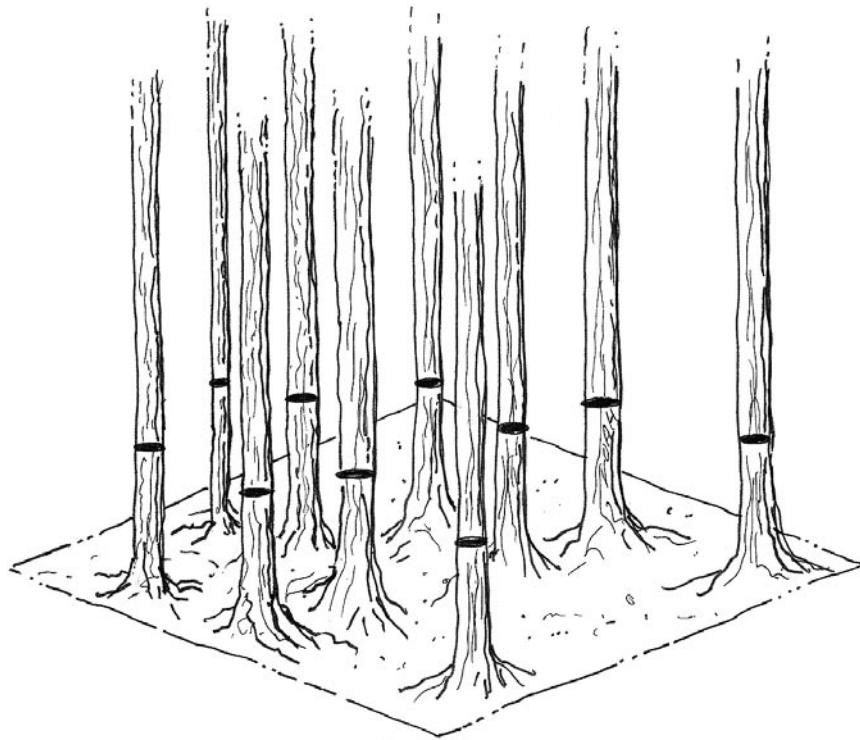


Figure 1. Illustration of *basal area*—sum of tree-cross-sectional area per acre at 4.5' above grade

- **Critical Root Zones** of trees in Secondary Tree Conservation Areas [City Code 10-2082.14 (b)(2)a-f, 10-2082.14(d)] must be completely included in all tree conservation areas. (TC-7-04 Section 16)
- When planning a development within a Metro Park Overlay District that exceeds an impervious surface coverage of 30%, in addition to the other requirements of 10-2053(e)(4), trees 5 inches dbh and larger must be identified where proposed grade changes lie within their critical root zones. See Figure 2.

DBH: The diameter of the tree trunk measured at 4.5' above the soil line—commonly referred to diameter at breast height, or *dbh*. (TC-7-04 Section 1) *Dbh* can be accurately measured with a Biltmore stick or a diameter tape. See Figure 3.

DWQ: The North Carolina Division of Water Quality in the Department of Environment and Natural Resources.

Excessively trimmed: The pruning, cutting, or otherwise damaging the natural form of a tree when it meets one or more of the following:

- (1) Removes more than 25% of the crown system of a tree within a continuous five-year period.
- (2) Removes, cuts, or covers more than 25% of the root system of a tree within a continuous five-year period.
- (3) Fails to conform to the pruning cut methods set forth in the current edition of “**Tree, Shrub, and Other Woody Plant Maintenance—Standard Practices**” of the American National Standards Institute.
- (4) Is made for a purpose other than “hazard pruning,” or “utility pruning,” or “maintenance pruning” as set forth in the current edition of “**Tree, Shrub, and Other Woody Plant Maintenance—Standard Practices**” of the American National Standards Institute.
- (5) Is crown reduction, heading, vista pruning, or pollarding as set forth in the current edition of “**Tree, Shrub, and Other Woody Plant Maintenance—Standard Practices**” of the American National Standards Institute.

(Existing definition)

Forestry general: (TC-7-04 Section 3) A woodland area where all of the following occur:

- (1) the growing of trees; and
- (2) the harvesting of trees, leaves or seeds; and
- (3) the regeneration of trees by the replanting of trees at the rate of one inch *caliper* tree measured six inches (6") above the ground per every two hundred (200)

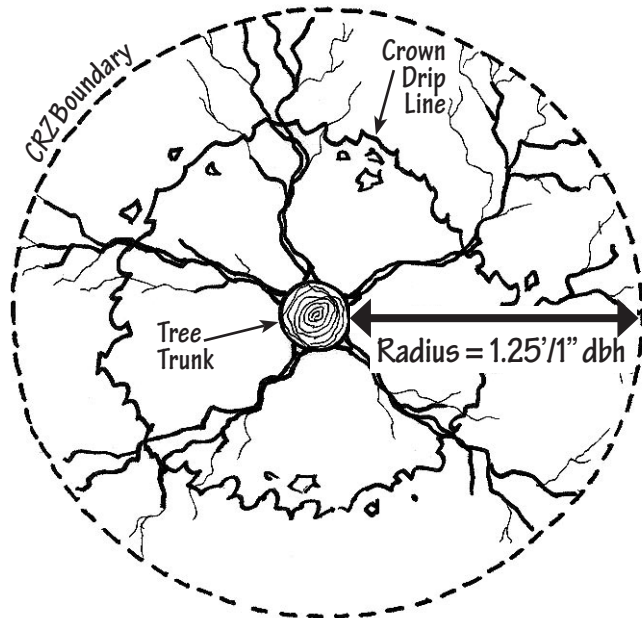


Figure 2. Plan view of tree critical root zone (CRZ).

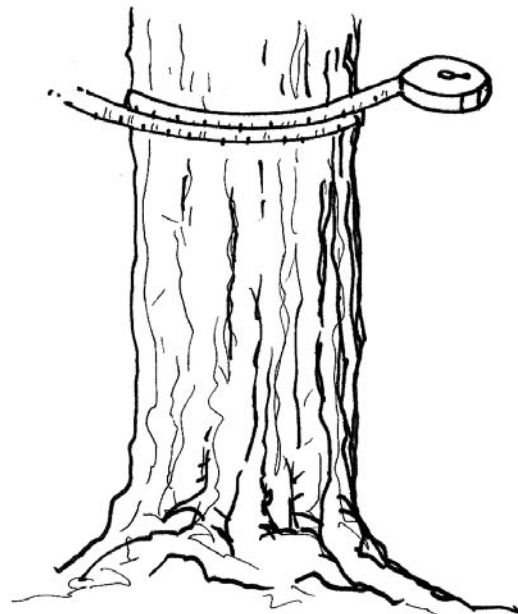


Figure 3. Tree DBH is measured with a forester's diameter tape or Biltmore Stick at 4.5' above grade.

square feet of *tree disturbing activity* area within 220 days of harvesting; and” (TC-7-04 Section 3 & Section 21) (Note: Bare root stock may be used provided one inch of total caliper is planted every 200 square feet of disturbed area.)

- (4) the application of “best management practices”, including the N.C. Department of Environment, Health and Natural Resources, “**Forest Practice Guidelines Related to Water Quality**”— Title 15A North Carolina Administrative Code, subchapter 11, sections 1.101–.0209, and all successor documents.
- (5) a forest management plan is prepared or approved either by a professional forester registered in the State of North Carolina or by the Division of North Carolina Forest Resources. Copies of the forest management plan shall be provided to the City upon request.
 - *Forestry General* is regulated as a conditional use with a tree conservation permit.
 - A *tree conservation plan* must be approved, and a tree conservation permit must be obtained, prior to conducting tree-harvesting operations. Tree-harvesting operations that are unrelated to a site development plan or to a grading permit require a replanting plan, a forest management plan, and the application of “best management practices.”
 - See *Tree disturbing activity except a minor tree removal activity* for permit conditions pertaining to tree-harvesting operations on any lots 2 acres or more in size. (City Code Section 10-2072-Regulations for Conditional Use, TC-7-04 Section 8)

Minor Tree Removal Activity: Is the legal removal of trees as described below. A *Minor Tree Removal Activity* is a General Use and does not require a permit. (City Code 10-2071—**Schedule of Permitted Land Uses In Zoning Districts**, TC-7-04 Section 4)

• **Types Of Tree Removal That Are Legal Without A Permit Or Management Plan:**

- Unsafe trees within 1 year after a government-declared natural disaster.
- Removal of as many trees as desired that are smaller than 3” *dbh*.
- Removal of up to 15 trees, 3” *dbh* and larger, within any 12 month period, provided that trees 10” *dbh* and larger are not removed if they are within:
 - 50’ of a thoroughfare.
 - 32’ of a *vacant* property.
 - 65’ of any other property line, including non-thoroughfare roadways.
- Removal of certified unsafe or *unhealthy* trees that are 10” *dbh* and larger, anywhere on the property. Certification must be done by a *Certified Arborist*, N. C. Registered Forester, or N. C. licensed Landscape Architect. An example would be a hazard evaluation done by a *certified arborist* and provided to the *City Forestry Specialist* that shows a 24” *dbh* oak to be structurally unsound.
- Removal of more than 15 trees, 3” *dbh* and larger, anywhere on the property, is allowed if they are certified unsafe or *unhealthy*. Certification must be done by a *Certified Arborist*, N. C. Registered Forester, or N. C. licensed Landscape Architect. An example would be removal of 50 trees that are infested with southern pine beetle.
- Removal of trees that are damaging an existing improvement on a lot.
- Removal of any number of trees on any size lots less than 2 acres, existing prior to application of this regulation.
- Removal of trees of any size or number covered by *Urban Forestry*.

• **Types Of Tree Removals That Are Illegal Without A Tree Conservation Permit:**

- A property cannot be subdivided to remove more than 15 trees in any 12-month period.
- Removal of Champion Trees.
- Removal of trees in *Resource Management (RM) Districts*.
- Removal of trees in Conditional Use Zoning districts.
- Removal of trees in *natural protective yards*.

- Removal of trees related to the practice of *Forestry General*.
- Removal of trees related to driveway installations.
- Removal of trees related to installation of a use, or structure, or facility improvement.
- Removal of trees related to a site plan or subdivision plan.
- Removal of trees on lots 2 acres and larger in size.
- Removal of trees 10" *dbh* and larger within 50' of a thoroughfare.
- Removal of trees 10" *dbh* and larger within 32' of vacant property.
- Removal of trees 10" *dbh* and larger within 65' of any other property line, including non-thoroughfare roadways.
- Trees 10" *dbh* and larger in the protected buffers can be removed through a permitted *Forestry General* tree harvest, if either:
 - 1) *TCA*s are established prior to harvest;
 - 2) The buffers are harvested, replanted, and a deed covenant is placed on the property that prevents it from being developed for five years; or
 - 3) Establish *TCA*s prior to harvest according to 10-2082.14 and harvest the remaining area. (See 10-2072: *Tree disturbing activity except a minor tree removal activity*)

Natural protective yard: A landscaped yard area that does not contain buildings, vehicular surface areas, loading, storage, display areas, or service areas. This designation also regulates certain other uses according to the **Schedule of Permitted Land Uses Within Types of Yard Areas**—City Code 10-2075(e). No tree removal or grading can take place unless it is in accordance with the requirements for a Tree Conservation Permit (10-2082.12) for street protective yards in Resource Management Zoning Districts. A Tree Conservation Permit cannot be issued if the cumulative grading and tree removal exceeds thirty (30) per cent of any *natural protective yard*. (Existing definition)

Non-vacant: At the time of application for development, a building or structure or vehicular surface area is within 200' of the common property line of the property being developed and the adjacent property.

Resource Management Zoning District (RM): Any of the following general use, conditional use, and overlay zoning districts: Conservation Management District (CM), Metro-Park Overlay District (MPOD), Thoroughfare District (TD), Special Highway Overlay Districts 1 – 4. (Existing definition)

Shade tree: An evergreen or deciduous tree that will attain a mature height greater than 35 feet, with an expected crown spread of 30 feet or more, as determined by the latest edition of "**American Standards of Nursery Stock**." (Existing definition)

Tree Conservation Plan: A formal plan, submitted to the City for review and approval, to preserve trees as required by TC-7-04. See the appendix for additional requirements of Tree Conservation Plans.

A Tree Conservation Plan is required for lots 2 acres and larger in size for:

- Clearing or removing 16 or more trees on a property for any reason that is unrelated to development or subdivision of property, whether the lot is occupied or vacant;
- Tree-harvesting operations related to *Forestry General*;
- Clearing or harvesting of trees on sites which do not have an approved site-development plan, do not have an approved subdivision plan, or do not have established *Tree Conservation Areas*.
- Site plans and subdivision plans for properties with tree cover or scattered, open-grown trees on the property, including previously developed tracts.
- Installation of driveways, a structure, a use, or facility improvement.
- Tree removal or disturbance for land-clearing & grading permits prior to site plan approval.
- Tree removal or disturbance for any other tree-disturbing activity other than minor tree removal.

A *Tree Conservation Plan* is required for lots less than 2 acres in size for:

Site plans for non-residential lots less than 2 acres in size with wooded areas adjacent to thoroughfares or with riparian buffers on the property unless otherwise approved by the Planning Commission.

Tree disturbing activity: Any activity that disturbs trees in any way, including but not limited to the following: (TC-7-04 Section 1)

- (1) The movement of earth, compaction of earth, chemical or physical alteration of earth; or a change in the existing soil cover and/or the existing soil topography; in the *critical root zone* of a tree. This includes, but is not limited to: clearing, grading, filling, excavation, stabilization of structures, road or walkway construction.
- (2) Chemical or physical alteration of a tree in any way that diminishes its health and vigor, including but not limited to: removal, cutting, root pruning, branch pruning, topping, bark scraping, and application of chemical or biological agents.
- (3) The placement within the *critical root zone* of any permanent or temporary structure, including but not limited to: impervious surfaces; storage of equipment, materials, or earth; parking or traffic of vehicles or equipment.

Understory tree: An evergreen or deciduous tree that will attain a mature height between 15 feet and 35 feet, with an expected crown spread between 15 feet to 25 feet, as determined by the latest edition of “**American Standards of Nursery Stock**.” (TC-7-04 Section 1)

Undisturbed area: An area free of *tree disturbing activities* except planting required by 10-2082 & conditional use zoning requirements. Planting is not allowed within the *CRZs* of protected trees. (TC-7-04 Section 1)

Unhealthy: A plant or tree is *unhealthy* when it meets one or more of the following (Existing Definition):

- (1) Foliage and bark uncharacteristic of the species within Raleigh.
- (2) Twig elongation is dissimilar to that of same species and size within Raleigh.
- (3) Infested with detrimental insects or disease.
- (4) Greater than 10% of its trunk dies within one calendar year.
- (5) Greater than 30% of its crown dies or is lost within one calendar year.
- (6) It no longer screens, filter, or shades the area for which it was installed.

Urban Forestry: The management of wooded areas for the benefits they provide (physiological, sociological, aesthetic, environmental, economic & well being of urban society). (TC-7-04 Section 1)

ACTIVITIES THAT ARE LEGAL without a management plan or permit: Tree planting. Tree pruning. Tree removal. Other tree maintenance practices.

ACTIVITIES THAT ARE ILLEGAL Removal of trees for the sale of wood products of any kind. The building of roads, trails, logging decks. The movement, alteration, or compaction of earth. The use of high-impact equipment including skidders, tree harvesters, forwarders, mechanical planters, excavators, dozers, similar tracked or wheeled vehicles. Reducing tree density to a *basal area* less than 60.

Note: This definition allows home landscaping; including tree removal, within the protected buffers, without the requirements of permits or management plans; as long as tree density is maintained at a *basal area* of at least 60 sq ft per acre comprised of trees 3” dbh or larger.

Vacant: At the time of application for development, a building or structure or vehicular surface area is not within 200’ of the common property line of the property being developed and the adjacent property.

10 “Major Tree Disturbing Activities”— Removal Of Sixteen Or More Trees

City Code, Section 10-2072 {Regulations for Conditional Use} was amended to add a new subsection titled: ***Tree disturbing activity except a minor tree removal activity*** (Referred to as Major Tree-Disturbing Activity in this manual). This section regulates tree-harvesting operations, *forestry general*, and removal or clearing of trees on sites two acres and larger in size, which do not have: established TCAs, an approved site development plan, or an approved subdivision plan under this section. Under this section trees may be harvested as part of a forestry plan with no intent to develop the property. Or, trees may be cleared from a site in cases where future development is expected, but a site plan or subdivision plan has not yet been approved. A permit is required to perform *major tree-disturbing activities*. (TC-7-04 Section 8)

Major Tree-Disturbing Activities Allowed With A Tree Conservation Permit:

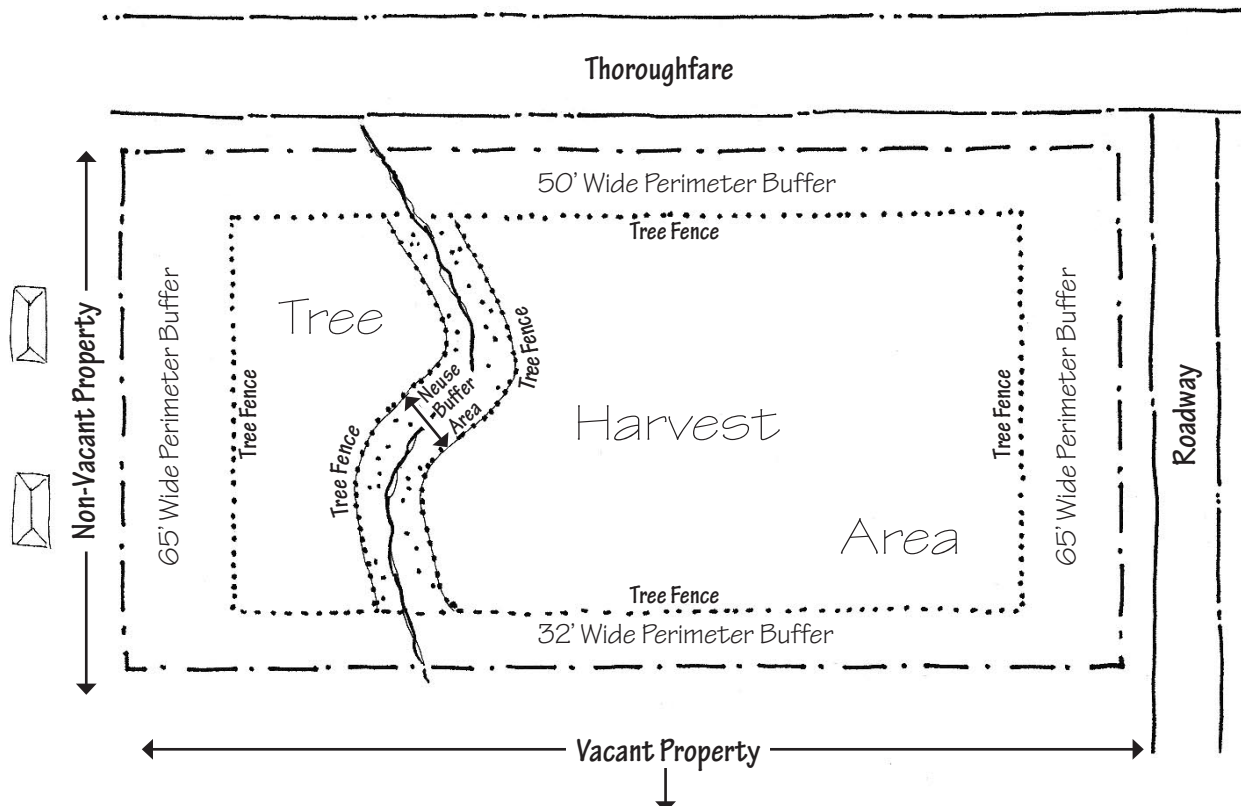
- Removal of 16 or more trees 3" dbh or larger in size within any 12-month period for any reason.
- Tree harvests.
- Tree removal or disturbance related to *Forestry General* as defined in the City Code.
- Tree removal or disturbance for driveway installation.
- Tree removal or disturbance for installations of a use, structure, or facility improvement.
- Tree removal or disturbance for land-clearing & grading permits prior to site plan approval.
- Tree removal or disturbance for any other *tree-disturbing activity* other than minor tree removal.

(TC-7-04 Section 8)

Conditions of Allowed Major Tree Disturbing Activities:

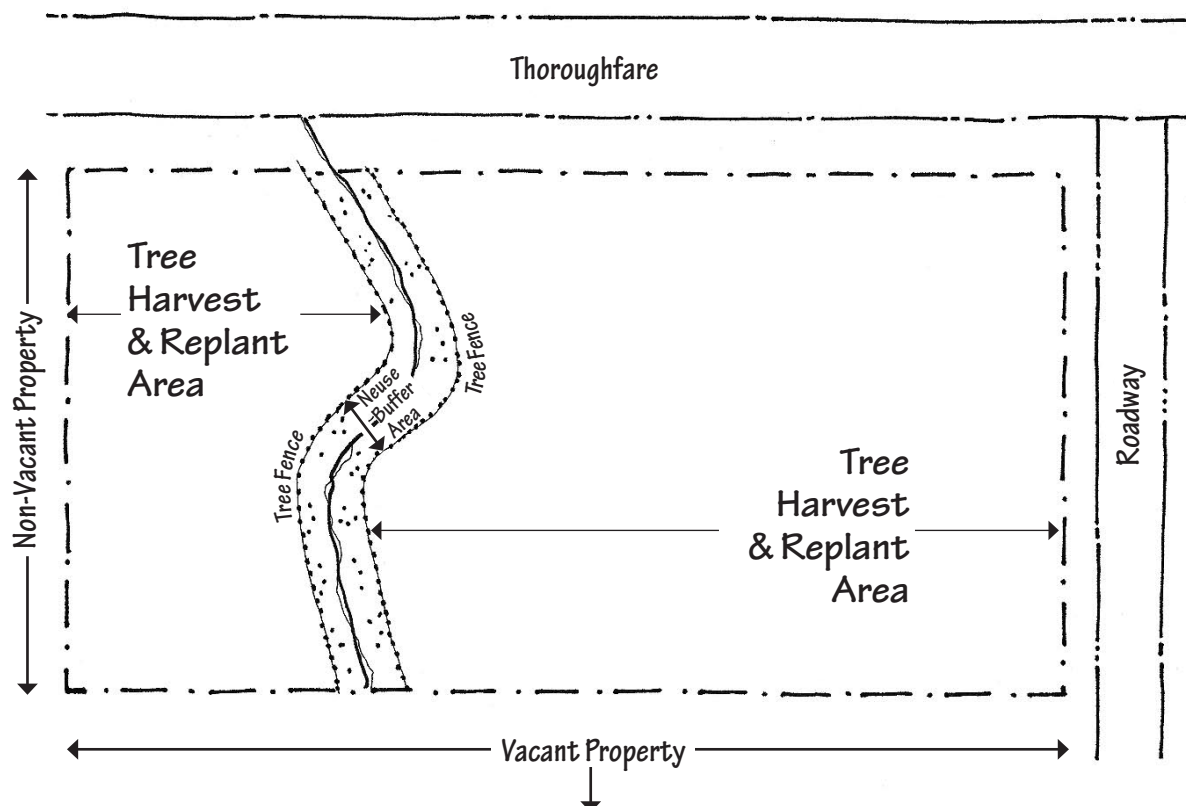
- (1) A *Tree Conservation Plan* must be approved by the *City Forestry Specialist*. A more simple tree protection plan may be acceptable for small-scale jobs.
- (2) A Tree Conservation Permit must be obtained from the Inspections Department.

Figure 4. Scenario 1: Tree harvest—All buffers are protected and undisturbed. The protected buffer area is at maximum size; harvest area is at minimum size.



- (3) Only *minor tree removal activities* are allowed in the 32' perimeter buffers adjacent to vacant properties until *TCAs are established*.
- (4) *Forestry General* is allowed in the perimeter buffers provided that landowners first record with the county register of deeds a covenant running with and binding the land that states that: "Forestry general operations were initiated within regulated perimeter buffers of the real property on (fill in date and year), and that pursuant to state law, no building permit, or subdivision plan will be approved by the local governing authority for a period of five years following harvesting." A copy of this covenant recorded with the county register of deeds *shall* be provided to the Zoning Enforcement Administrator and to the Planning Director.
- (5) Only *minor tree removal activities* are allowed in the 65' perimeter buffers adjacent to roadways (does not include thoroughfares) and non-vacant properties until *TCAs are established*. *Forestry General* is permitted with conditions described above.
- (6) Only *minor tree removal activities* are allowed within the 50' buffer adjoining thoroughfares until *TCAs* are established. *Forestry General* is permitted with conditions described above.
- (7) Tree protection measures must be installed in the field and verified by the Inspections Department prior to commencement of work.
- (8) Access ways for tree disturbance cannot exceed 25' in width.
- (9) The permittee must comply with City & State regulations for land disturbance & erosion control.
- (10) One access way is permitted. Additional access ways may be allowed if justified by a Registered Forester & are spaced 1000' or more apart when fronting the same roadway.
- (11) Hours of allowed operation are: 7 am – 8:30 pm, 7 days/week.

Figure 5. Scenario 2: Entire site is harvested and replanted except riparian buffers. Harvest area is maximized, but the area cannot be developed for 5 years because the protected buffers were harvested.



- (12) All applicable laws, including soil erosion, sedimentation control, & tree protection regulations must be obeyed.
- (13) Prohibited: Disturbance or removal of any Champion Tree or its Critical Root Zone.
- (14) Neuse riparian buffers must be established prior to, and protected during, Major *tree disturbing activities*.
- (15) Tree disturbance on any land zoned *RM* district must comply with 10-2082.12 and 10-2075(e)—**Schedule of Permitted Land Uses Within Types of Yard Areas.**
(TC-7-04 Section 8)

Tree Clearing, Tree Removal, and Tree Harvests

Tree harvesting and clearing of trees from a site are illegal in *Resource Management Districts*, or where Conditional Use zoning conditions restrict tree removal. Tree harvests, thinning operations, and removal and clearing trees on a site are allowed with a permit, in all other zoning districts on tracts of land two acres or larger in size. *Champion trees* and their *CRZs* shall not be removed or disturbed. *Major Tree Disturbing Activities* such as tree harvesting and tree clearing are allowed by permit under three scenarios.

1. A site can be timbered or cleared of trees, anywhere on the tract except in the protected buffers which are: Neuse riparian buffer, RM District buffers, 50' wide thoroughfare buffer, the 65' wide perimeter buffers when the adjoining property is either *non vacant* or is a roadway other than a thoroughfare, and 32' wide perimeter buffers

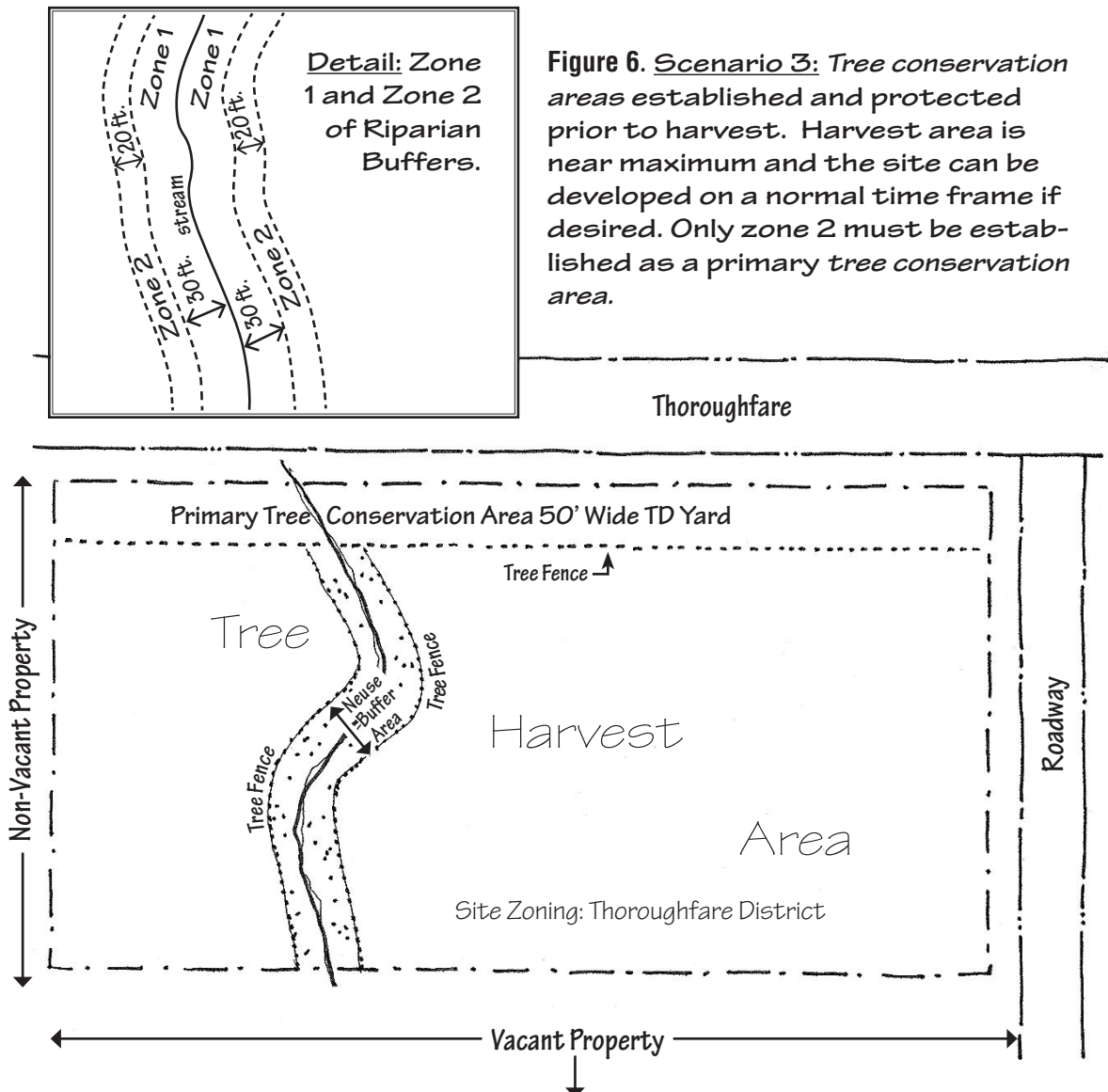


Figure 6. Scenario 3: Tree conservation areas established and protected prior to harvest. Harvest area is near maximum and the site can be developed on a normal time frame if desired. Only zone 2 must be established as a primary tree conservation area.

adjacent to vacant properties. See Figure 4.

2. Development of Property is Not Allowed for Five Years: The site can be timbered or cleared of trees in the protected 32' wide and 65' wide perimeter buffers, and in the 50' wide thoroughfare buffers if:
 - a. All components of the definition of *Forestry General* are met, and,
 - b. The landowner first records with the register of deeds, a notice statement that runs with and binds the land that states: "*Forestry general* operations were initiated within regulated perimeter buffers of the real property on (fill in date and year), and that pursuant to State Law, no building permit, *site plan*, or subdivision plan will be approved by the local governing authority for a period of five years following harvesting." Copies of this covenant, recorded with the local county register of deeds, shall be provided to the Zoning Administrator and to the Planning Director. See Figure 5.
3. Establish Tree Conservation Areas On The Property Prior To Tree Harvest Operations: *TCAs* may be established on the property as required by City Code 10-2082.14, and the remainder of the site can be timbered or cleared of trees, and the property may be developed in a normal time frame. (TC-7-04 Section 8) See Figure 6.

Limitation on subdivision approval if perimeter buffers are disturbed:

City Code Section 10-3006—Limitation on Subdivision Approvals—was amended so that no subdivision plan can be approved on any parcel of a parent tract when *Forestry General*, or tree harvesting, occurred within the last five years on the parent tract, and the 32' wide and 65' wide perimeter buffers were not preserved. (TC-7-04 Section 20)

Limitation on issuance of building permits if perimeter buffers are disturbed: City Code 10-6035—Limitations On Issuance Of Permits—was amended so that no building permit will be issued on any parcel of a parent tract when *Forestry General* has occurred on the parent tract within the last 5 years, and the 32' and 65' wide perimeter buffers were not preserved. (TC-7-04 Section 25)

Violations of *Major Tree Disturbing Activity* — (10-2072 — *Tree Disturbing Activity Except a Minor Tree Removal Activity*) — Subjects the Offender to All of the Following:

- A civil penalty of \$1000 for the first tree or 35¢ per square foot of unlawfully disturbed perimeter buffer, whichever is greater.
- The penalty cannot exceed 1/3 current tax value of entire parcel (land value only—not buildings/structures).
- Replanting Required: The landowner must replant one 2" *caliper* tree per 300 square feet of unlawfully disturbed perimeter buffer. For RR and R2 parcels, no more than 15% of the entire tract must be replanted, and no more than 10% for all other zoning districts. The conditions of replanting are as follows:
 - The City Forestry Specialist must approve a tree replanting & maintenance plan.
 - Replanting areas shall follow the priorities of 10-2082.14(b), and must be established as *TCAs* on plats with metes & bounds survey descriptions, and recorded with the County register of deeds.
 - After the replanted *TCAs* are legally recorded as *TCAs*, they cannot be disturbed except in compliance with conditions of 10-2082.14.

(TC-7-04 Section 8)

14 Establishment & Protection Of Tree Conservation Areas:

10-2082.14 (TCAs) (TC-7-04 Section 16)

The Landscape Ordinance (Section 10-2082 of the City Code) was amended to add a new subsection on tree protection: 10-2082.14 — Establishment & Protection Of Tree Conservation Areas (*TCAs*). Interpretation and application of the new tree conservation regulation is described in this manual in the order in which it occurs in the ordinance.

(a) Intent Purpose and Application.

- (1) The intent of this section is to conserve one of the community's most valuable natural resources, the trees and natural vegetation of Raleigh. Trees are of aesthetic and ecological value and are preserved to: beautify the City, modify the effects of storm water runoff, filter pollutants from the air, mitigate glare and noise, help prevent soil erosion and sedimentation, provide visual buffers of streets and developments, preserve the unique identity and environment of the City of Raleigh, promote a more appropriate balance between the built environment and the natural environment, and preserve existing natural areas rather than remove and replant vegetation.
- (2) This regulation (Section 10-2082.14) became effective May 1, 2005. It *shall* apply to:
 - a. Subdivisions of any tract two acres or greater in size and,
 - b. Site plans for parcels two acres or greater in size on previously developed or undeveloped lots existing prior to this regulation, or for lots configured by recombination after application of this regulation, that become two acres or greater in size.

(b) Tree Conservation Areas Are Required

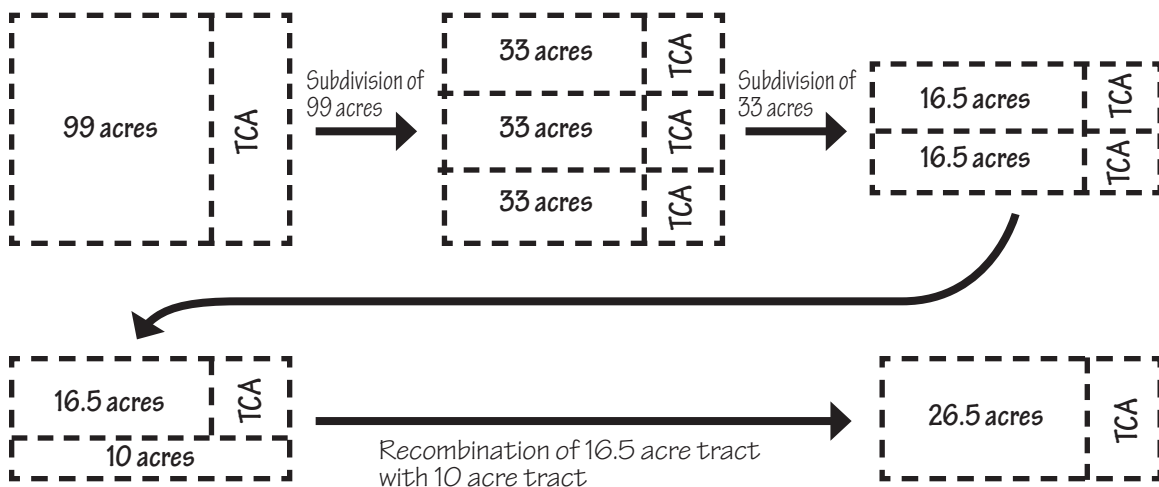
Tree Conservation Areas must be established prior to the approval of any subdivision or site plan for tracts of land two acres or larger in size as part of the *Tree Conservation Plan*. *TCAs* established on the parent tract will apply to further subdivision of the parent tract; future recombinations will require additional *TCA*. *TCAs* must be identified and established from the primary and secondary priorities listed below. See Figure 7.

When are the ordinance requirements for total Tree Conservation Area on a site fulfilled? The ordinance requirements for total Tree Conservation Area on a site are fulfilled when:

- 1) All required Primary *TCAs* on a site have been identified and the 15% or 10% total *TCA* requirement, whichever is applicable, is met or exceeded.
- 2) Or, all Primary *TCAs* (if any exist) on a site have been identified, and total site *TCA* is less than the 15% or 10% requirements. The site must then be examined for Secondary *TCAs*. When the 15% or 10% total *TCA* requirement is met at any point in the process of identifying Secondary *TCAs*, the requirements of the ordinance are fulfilled.
- 3) Or, a site is examined for all the Primary and Secondary *TCAs*, and total *TCA* is less than the 15% or 10% requirements.

{City Code 10-2082.14(b)(2)}

Figure 7. *Tree conservation areas—Subdivision and recombination.*



(1) Primary tree conservation areas Any site that is two acres or larger in size must be examined to identify and establish all Primary *TCA*s that exist on the site as required by this subsection—10-2082.14. (TC-7-04 Section 16) {10-2082.14(b)(1)a.-d.}

Four subsections of the Code spell out the Primary *TCA*s that must be identified and established wherever they exist on any site. These are discussed below. 10-2082.14(b)(1):

- a. *Resource Management (RM)* Zoning Districts and tree protection areas required by conditional use zoning or re-zoning conditions:

Tree Conservation Areas in *RM* districts are defined based on previously existing Code requirements for those districts.

1. **Conservation Management District**—10-2030: The entire *CM* district can be established as *TCA*.
2. **Metro Park Overlay District**—10-2053: Three areas are regulated in Metro Park Overlay Districts that must be established as *TCA*s:
 - 1) A 20'-wide undisturbed buffer from the edge of the park within the metro-park boundary required by 10-2053(d)(2)a.

Figure 8 illustrates identification of Resource Management *TCA*s on an 18.4-acre non-wooded tract zoned TD with SHOD-1 overlay.

Calculations

Primary *TCA* 50' Wide SHOD1 Yard

$$1000' \times 50' = 1.15 \text{ acs}$$

• Primary *TCA* 50' Wide TD Yard:

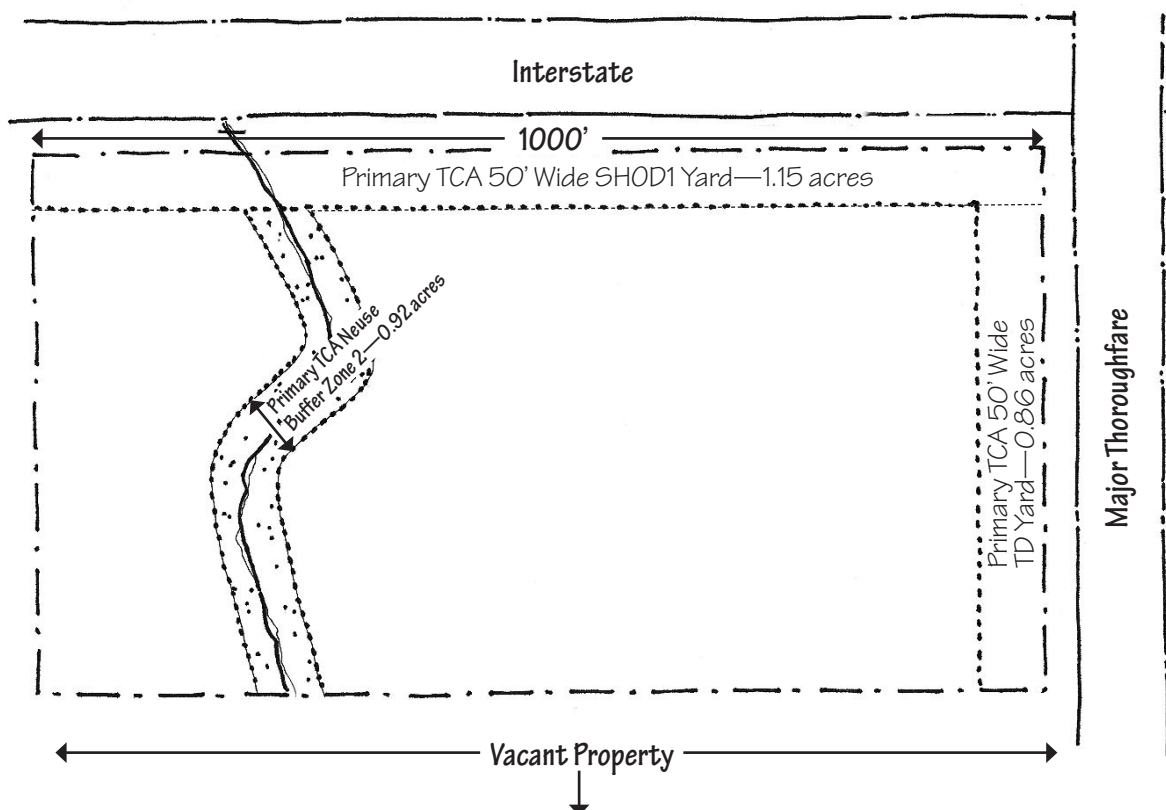
$$750' \times 50' = 0.86 \text{ acs}$$

• Primary *TCA* Neuse Buffer Zone 2:

$$1000' \times 20' \times 2' = 0.92 \text{ acs}$$

• SubTotal Primary *TCA* = 2.93 acs = 15.9%

• 10% *TCA* requirement is MET.



2) Only Riparian Zone 2 of the watercourse buffers required by 10-2053(d)(2)b. must be established as a *TCA*.

3) When impervious surfaces are 30%, the following areas must be established as *TCA*s:

- i. any required protective yards that contain trees $\geq 5"$ dbh,
- ii. a protective yard 50' wide from the metro-park boundary (that contains trees $\geq 5"$ dbh),
- iii. any required street protective yards that contains trees $\geq 5"$ dbh as required by 10-2053(e)(4)a.

3. Thoroughfare District—10-2045. The protective yards required by 10-2045 must be established as *TCA*s.

1) 90' protective yard if the property adjoins a thoroughfare or arterial.

2) The 90' yard may be reduced to a 50' protective yard if the plantings required in the 90' yard are doubled. This may be an average 50' yard that ranges from 35' – 75' wide. Note: If a developer desires to reduce the TD yard from 90' to 50', and use the 50' yard as a *TCA* instead of the 90' yard, a 100% tree survey must be submitted which shows that the trees preserved in the 50' yard will meet the TD planting requirements of 21 caliper inches per 50 linear feet for the 50' wide yard. Otherwise, the 90' yard must be preserved as a *TCA*.

3) 30' protective yard under certain conditions—refer to 10-2045.

4) 50' protective yard if the property adjoins any other street.

4. Special Highway Overlay Districts (SHOD) 1 - 4:

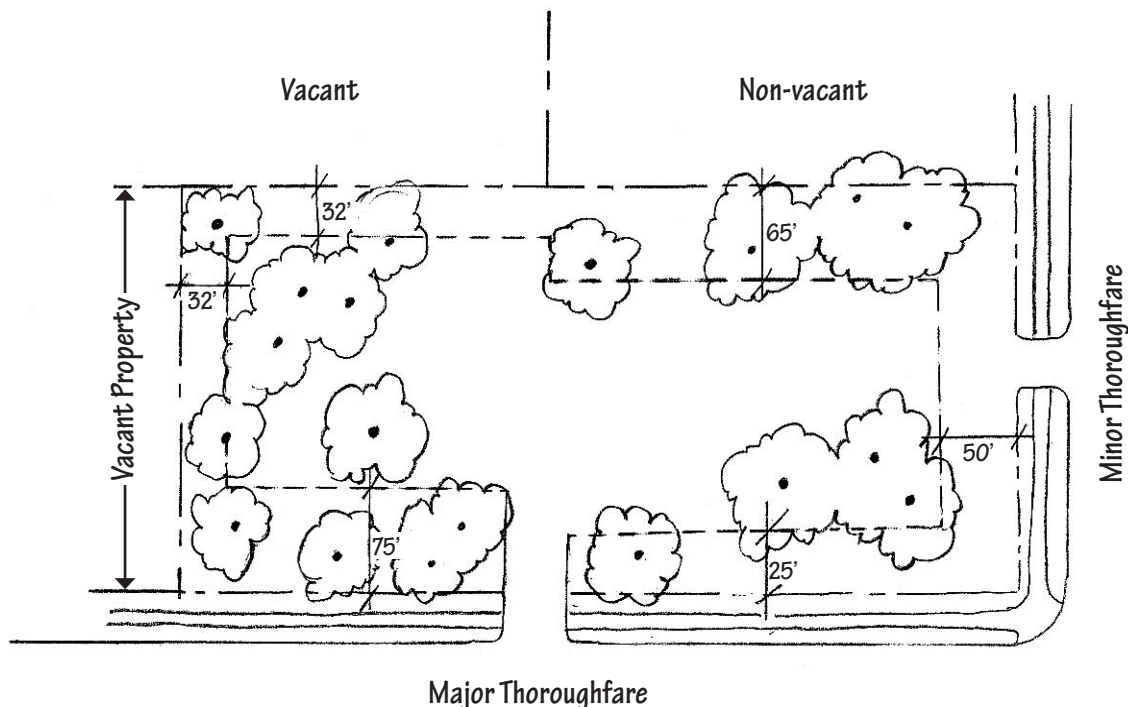
1) *SHOD 1*: 50' protective yard in most cases—10-2058(d)(2).

2) *SHOD 2*: 25' protective yard in most cases—10-2059(d)(2).

3) *SHOD 3*: 50' minimum average protective yard in most cases—10-2060(d)(2).

4) *SHOD 4*: 25' protective yard in most cases—10-2061(d)(2).

Figure 9. illustrates Secondary Tree Conservation Areas 10-2082.14(b)(2)a-d along thoroughfares and adjacent to vacant and non-vacant properties. The buffer along the major thoroughfare is average 50' wide.



5. Conditional use zoning or re-zoning conditions: Tree preservation areas such as natural protective yards and any others required tree-save areas must be established as TCAs.

- b. Areas containing healthy *Champion Trees* including their *CRZs*. The *CRZ* must be established as the *TCA*.
- c. Zone 2 of Neuse Riparian Buffers as established by the State, excluding government utility easements, must be established as the *TCA*.
- d. Areas with slopes of $\geq 45\%$ adjacent to or within floodways must be established as TCAs. The bottom edge of the slope begins where the grade changes from less than 45% to 45% or greater. The top of the slope is defined by where the slope changes from 45% or greater to less than 45%. The sides of this area are defined by where the slope changes from 45% or greater to less than 45%.

Figure 8 is an example of identification of the following primary *Resource Management TCAs* on a non-wooded property: SHOD 1 Yard, TD Buffer Yard, and Zone 2 Riparian Buffer Yard. SHOD Yards and TD yards must be planted according to their respective Code requirements.

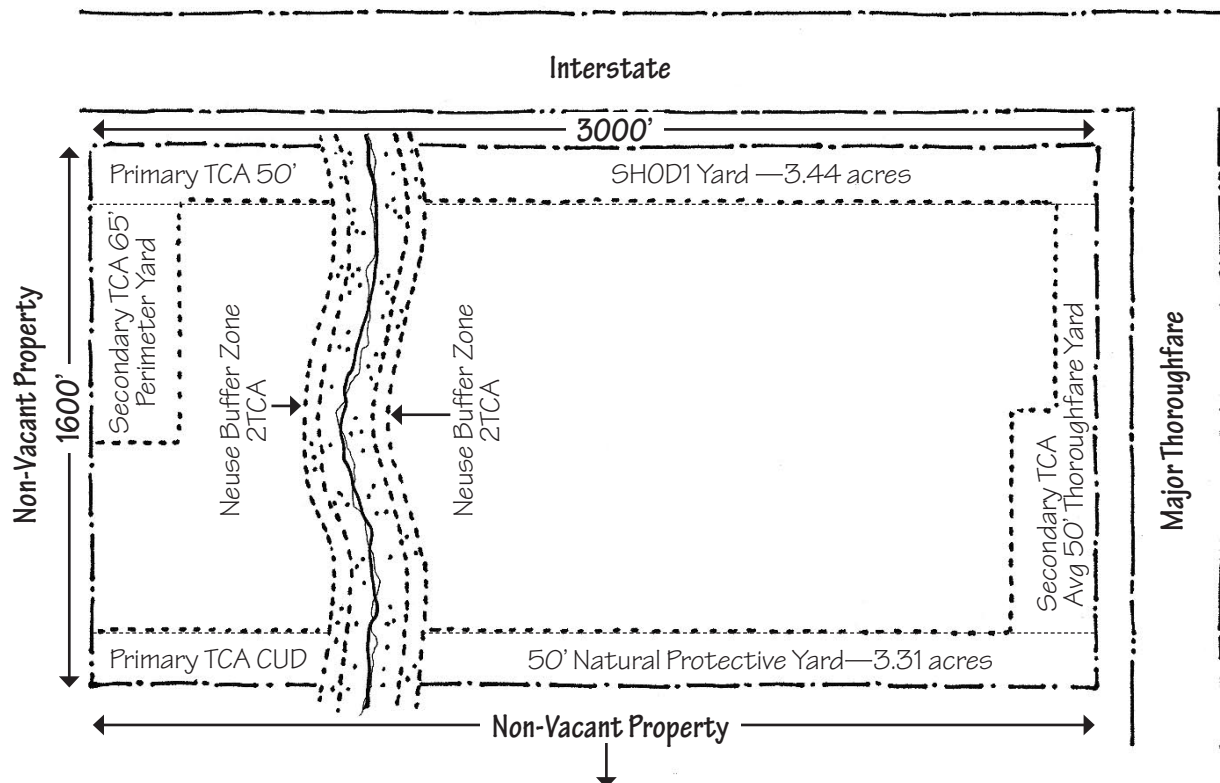
Figure 10: Establishment of primary and secondary perimeter TCAs on a 110.2-acre wooded site zoned R4-CUD. The 50' thoroughfare yard is variable width to protect tree CRZs. the 65' perimeter yard is large enough only to round out the 10% minimum TCA requirement.

Primary TCA Calculations

- Primary TCA 50' SHOD1 Yard: $3000' \times 50' = 3.44 \text{ acs}$
- Primary TCA 20' Neuse Buffer: $1550' \times 2 \times 20' = 1.42 \text{ acs}$
- Primary TCA CUD 50' NPY: $2880' \times 50' = 3.31 \text{ acs}$
- SubTotal Primary TCA = $8.17 \text{ acs} = 7.4\% // 10\% = 11.02 \text{ acs TCA needed}$

Secondary TCA Calculations

- $11.02 \text{ acs} - 8.17 \text{ acs} = 2.85 \text{ acres Secondary TCA needed.}$
- Secondary TCA 50' Thor. Yd: $1500' \times 50' = 1.72 \text{ acs}$
- SubTotal = $9.89 \text{ acs} = 1.13 \text{ acs more Secondary TCA needed.}$
- Secondary TCA 65' Perimeter Yd: $1.13 \text{ acs} \times 43560 \text{ sq ft/ac} = 49223 \text{ sq ft needed.}$
- $49223 \text{ sq ft} / 65' = 758' \text{ length of 65'-wide perimeter buffer to provide the 10\% required TCA of 11.02 acs.}$



(2) **Secondary tree conservation areas:** If the total land area of Primary TCAs on a site is less than a minimum of:

- 15% of the site for RR, R2; or,
- 10% of the site for all other zoning districts except Conservation Management (CM); Then,
- Secondary TCAs must next be established in descending order of priorities (a – f) listed below until the 15% or 10% minimum requirement for a total site TCA is met.

Secondary tree conservation areas defined—from highest to lowest priority (a – f):

- Major Thoroughfare Buffers:** An average 50' wide, undisturbed, wooded buffer with a *basal area* of 30 or more, adjoining any major thoroughfare. Buffer width begins at the right-of-way boundary and extends inward, varying from 0' – 100' wide. The variable-width of the buffer is functional, and must be adjusted to protect tree CRZs for trees that count toward the minimum *basal area* of 30. The buffer width can also be adjusted to make key site areas more visible or as otherwise needed by site design.
- Minor Thoroughfare Buffers:** An average 50' wide, undisturbed, wooded buffer with a *basal area* of 30 or more, along any minor thoroughfare. Buffer width begins at the right-of-way boundary and extends inward, varying from 0' – 100' wide. The variable-width buffer is functional, and must be adjusted to protect tree

Figure 11: Establishment of TCAs on a 45.9-acre wooded tract, zoned R-4, using primary, optional greenway, and secondary TCAs with alternate location of perimeter yard. Zone 2 which overlaps greenway is counted once.

Calculations

-Primary TCA Neuse Z-2: $1000' \times 20' \times 2' = 0.92 \text{ acs} = 2\%$

Subtotal Primary TCA = 0.92 acs = 2%

-10% of site = 4.59 acs—TCA requirement NOT MET.

-Optional Greenway TCA: $1000' \times (100' - 25' - 20') = 1.26 \text{ acs}$

Subtotal Site Total TCA = 2.18 acs. Need 2.41 acs TCA.

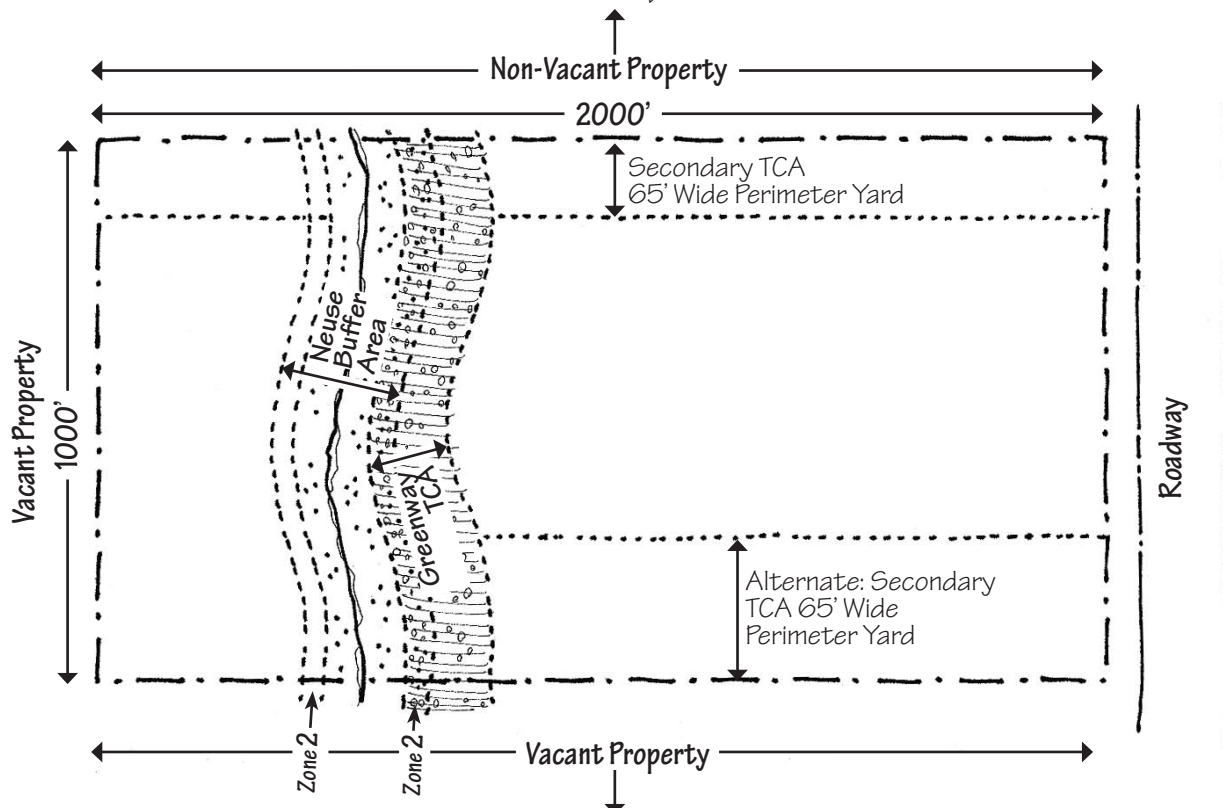
-Secondary TCA 65' Perimeter Buffer—North Side

$\{2.41 \text{ acs} \times 43560 \text{ sq ft/ac}\} / 65' = 1615' \text{ L buffer needed.}$

$65' \times 1615' = 2.41 \text{ acs}$

Total Site TCA = $0.92 + 1.72 + 2.41 = 4.59 \text{ acs} = 10\%$

TCA Requirements MET



CRZs for trees that count toward the minimum *basal area* of 30. The buffer width can also be adjusted to make key site areas more visible or as otherwise needed by site design.

- c. 65' Wide Perimeter Yard: An undisturbed, wooded area with a *basal area* of 30 or more, adjacent to property that is not vacant at time of application for development.
- d. 32' Wide Perimeter Yard: An undisturbed, wooded area with a *basal area* of 30 or more, adjacent to property that is vacant at time of application for development.

Note: All buffers are measured from the property boundary line.

Alternate means of compliance with priorities (2)c. or (2)d.: Undisturbed TCAs can be established anywhere on site to substitute for the 65' wide and 32' wide perimeter yards {(2)c. and (2)d.} as long as the substituted area is equal to the area required in 2c or 2d and has a *basal area* of 30 or more. The minimum size for an alternate TCA is 4000 square feet with a minimum dimension of 20 feet in any direction. Zone 1 of Neuse Buffers is not eligible for alternate compliance unless it is also part of a City greenway.

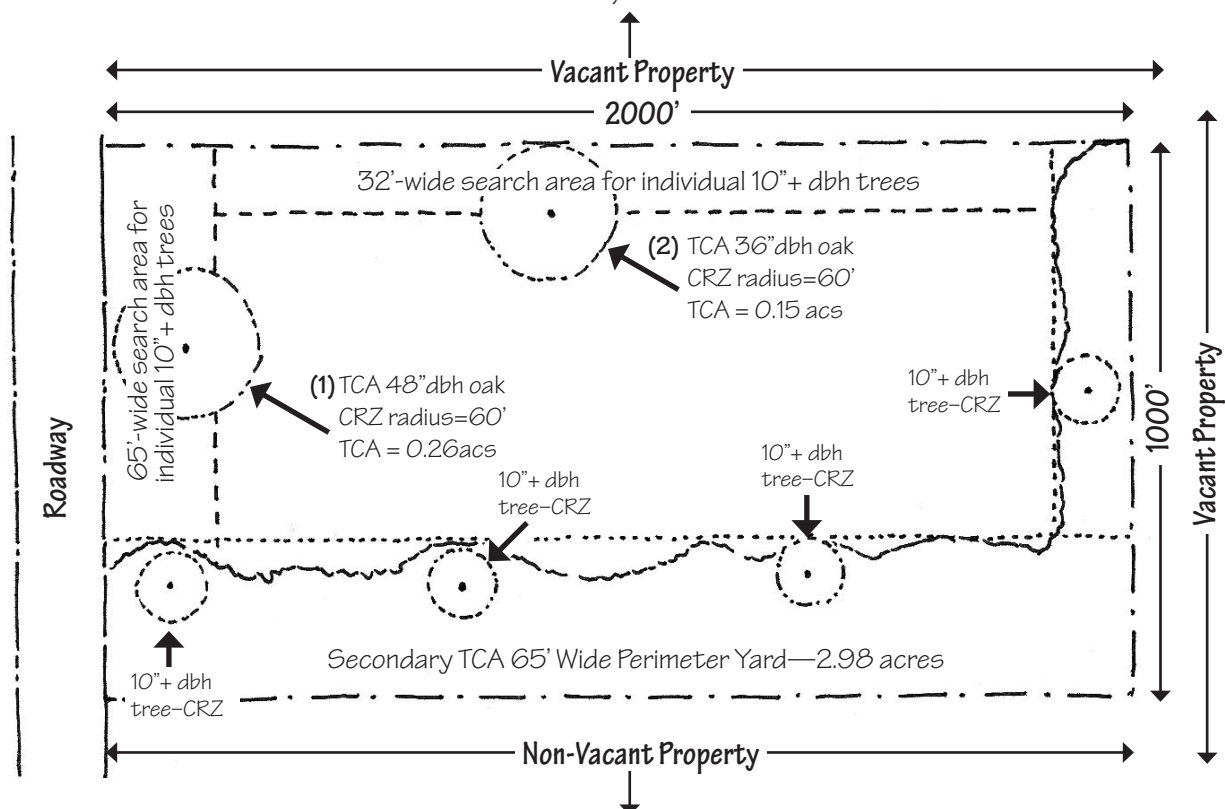
If the 15% or 10% TCA requirement is not yet met after examining for Primary TCAs and Secondary TCAs a. – d.; Secondary TCAs e. & f., consisting of individual trees 10" dbh and larger (and their CRZs) must be located on the property within the specified distances of the boundaries.

Figure 10 illustrates identification of primary and secondary perimeter TCAs on a wooded site. Note the 50' thoroughfare yard is variable width on the east to protect tree CRZs. The 65' perimeter yard on the west is

Figure 12. Establishment of TCAs on a 45.9-acre partially-wooded R-4 tract using perimeter buffers and individual trees 10" dbh and larger located within the 65' and 32' wide search areas. Tree CRZs that extend beyond the search area must be preserved, and the TCA for an individual tree 10" dbh and larger is the area of the CRZ "circle."

Calculations

- No Primary TCAs on site. Total TCA Required = 10% = 4.59 acs
- Secondary TCA 65' Perimeter Buffer—S Side: 65' X 2000' = 2.98 acs
- Secondary TCA 32' Perimeter Buffer—E Side: 32' X 935' = 0.69 acs
- Subtotal Site Total TCA = 3.67 acs. Need 0.92 acs TCA**
- Tree (1) TCA = 0.26 acs, Tree (2) = 0.15 acs
- Total Site TCA = 4.08 acs & < 10%** (OK, because all priorities have been examined)



large enough only to round out the 10% minimum *TCA* requirement.

- e. Trees 10" *dbh* and larger, including their *CRZs*, within 65' of roadways or any non-vacant property boundaries, must be preserved as *TCA*s.
- f. Trees 10" *dbh* and larger, including their *CRZs*, within 32' of any vacant property boundaries, must be preserved as *TCA*s.

For priorities 2e and 2f, a tree cannot be preserved as a *TCA* if it is:

- 1. Located within a sight triangle as defined by NCDOT;
- 2. Located within a slope easement or any easement that prohibits trees;
- 3. *Unhealthy* according to section 10-2002 subsections (1) through (5).

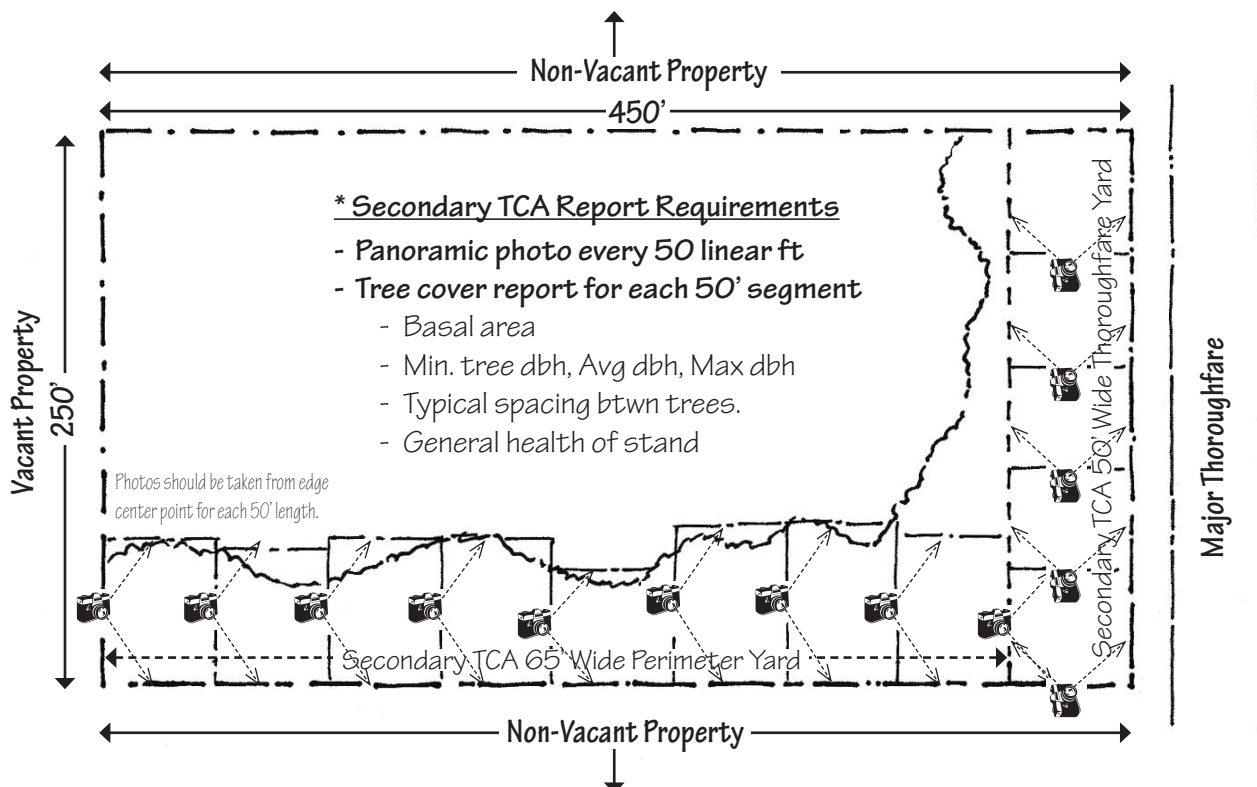
(c) Existing Tree Cover Is Required:

Secondary *TCA*s (2)a. - (2)d., including alternate compliance areas, must have at least 30 square feet of *basal area* per acre of tree cover, measured in 50' long increments. Trees outside the *TCA* cannot be used to calculate *basal area*. *Basal area* can be calculated from tree *dbh* for trees 3" *dbh* and larger. See the definition of *basal area*; also the appendix for additional information about measurement of *basal area*.

Plan submittal requirements for *Secondary Tree Conservation Areas*: For developments that use *Secondary TCA*s to meet the 15% or 10% requirements, the following items must be included with submitted Tree Conservation Plans:

- (1) Photo panoramic panels of proposed *TCA*s. Each photo panel must represent 50' of length of the proposed *TCA*. See Figure 12—*Secondary TCA* report requirements.
- (2) A certified tree cover report; prepared by a Certified Arborist, Registered Forester, or Landscape Architect; that describes for each fifty linear feet of *TCA*: tree species composition, minimum *dbh* down to 3" *dbh*, maximum

Figure 13. *Secondary TCA* photo and report requirements. Photos should be taken facing the length of the buffer with a wide angle lens to include as much of each 50' length of perimeter yard as possible.



dbh, average *dbh*, average spacing between trees, *basal area*, general health & vigor of the stand. Report & photos must be interrelated.

- (3) The most recent aerial photo of the site with all *TCA*s delineated on the photo.

A survey of all trees 3" *dbh* and larger can be substituted in lieu of the photo documentation & aerial photo. Note: The tree cover report is still required for each 50 linear feet of buffer, and must include a *basal area* calculation for each 50 linear feet of buffer.

(TC-7-04 Section 16)

(d) Delineation Of Secondary Tree Conservation Areas On Plans:

Secondary TCAs (2)e. and (2)f.: For Secondary *TCAs* (2)e. and (2)f., for individual trees 10" *dbh* and larger, the *TCA* is defined by and is equal to the circular Critical Root Zone of the tree.

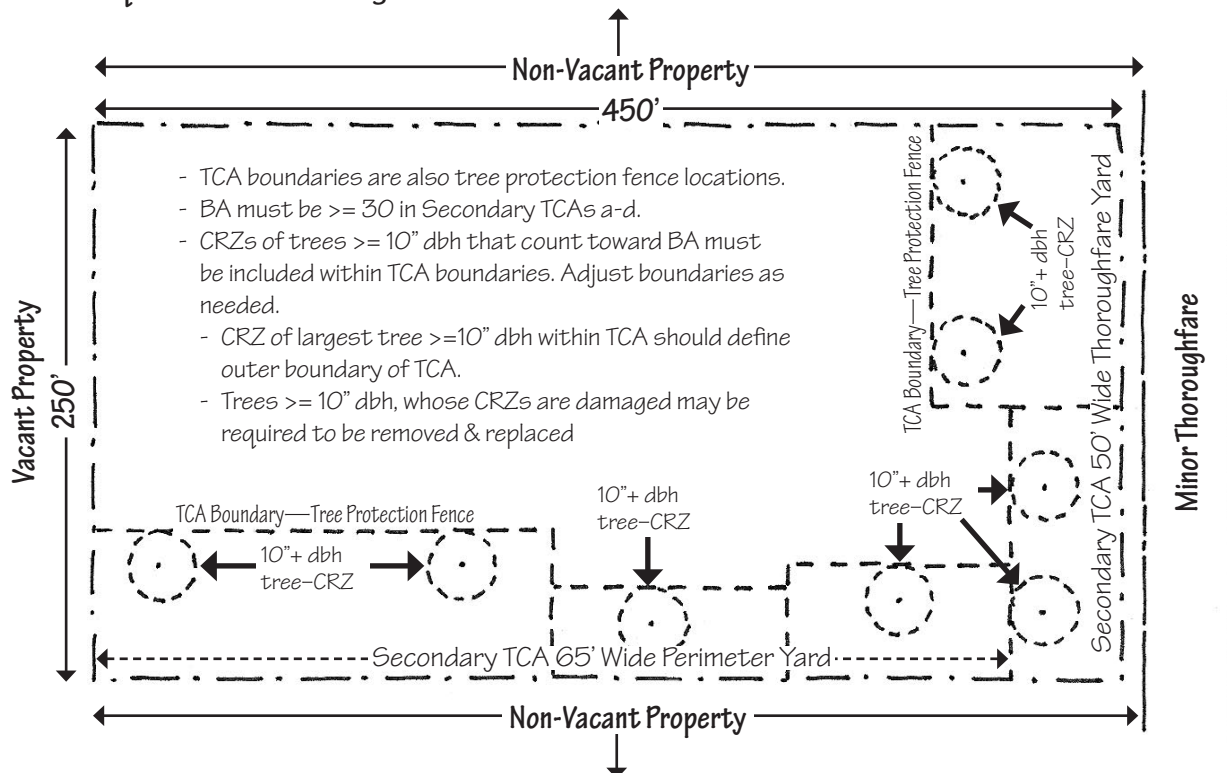
On previously developed sites undergoing a new site plan or subdivision, with trees 10" *dbh* and larger, tree root systems have adapted to the site conditions; and tree roots are growing around buildings, structures, and pavement. To establish *TCAs* on these sites, the *Critical Root Zone* circle for each tree 10" *dbh* and larger within the code-defined search areas must be shown on the plan, and all existing encroachments (building footprints, parking lots, retaining walls, etc) into the tree *CRZ* must also be shown and labeled on the plan. Only the area of *CRZ* within property boundaries, and not occupied by existing encroachments, is to be established as *TCA* with metes and bounds descriptions and acreage calculations. See Figure 14.

Items that cannot be included in delineation & calculation of Secondary *TCAs* are: government easements, utility easements, any area devoted to (or to be devoted to) streets, sidewalks, walkways, driveways, storm drainage facilities, & storm water control measures.

***TCAs* must be established** in instances where access easements have trees along property boundaries. The *TCA* shall be determined in one of two ways.

- 1) The 65' or 32' *TCA* perimeter buffer shall start at the back of the access easement or,
- 2) The owner shall provide an alternate *TCA* of equal size at another location on the property.

Figure 14. Delineation & Area Calculation of Secondary TCAs a. - d. Must be done in squares and rectangles.

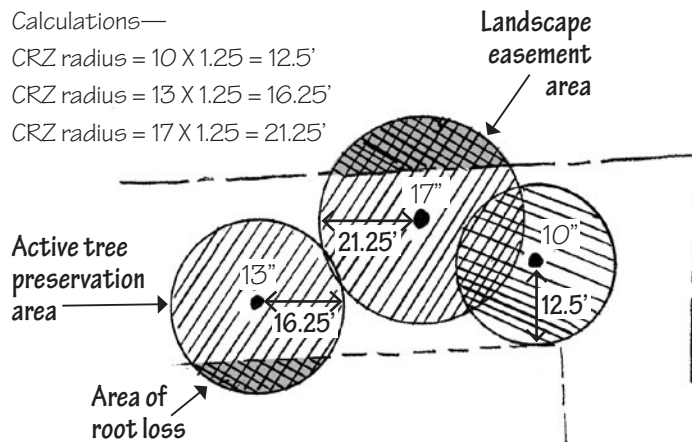


Dimensions of Tree Conservation Areas: No dimension of any Secondary *TCA* (2)a. - (2)d. can be less than 20'. All the dimensions requirements of (2)a. - (2)d. must be met (i.e. avg 50' wide thoroughfare buffers, 65' & 32' wide perimeter buffers, alternate compliance areas—minimum size 4,000 sq ft).

City greenways can be used toward the *TCA* requirement: At the owner's option, a City greenway may be included as a *TCA* whether the greenway is wooded or not. Zone 1 of Neuse riparian buffers, if designated as greenway, may also be included as a *TCA*. The area of trail construction, defined as an area 25' wide X length of greenway trail, cannot be included in the calculation of greenway *TCA*. Measurement of basal area, photo panels, and tree report are not required.

Critical Root Zones (CRZs): All Secondary *Tree Conservation Areas* (2)a. - (2)d., including alternate compliance areas for secondary *TCAs* (2)c. and (2)d., must include the *Critical Root Zones* for trees 10" dbh and larger that are within a *TCA*. Secondary Areas (2)e. and (2)f. must include *CRZs* for individual trees 10" dbh and larger preserved as *Tree Conservation Areas*. A landscape easement may be obtained from an adjoining property owner to prohibit *CRZ* disturbance of high-value border trees, and that easement area can be used toward the 15% or 10% *TCA* requirement, but cannot be double counted when the adjoining property is developed. See Figure 15.

Figure 15. Trees 10" dbh and larger with portions of *Critical Root zones* outside the *TCA* borders cannot be counted toward the basal area requirement unless an easement is obtained from the adjoining property owner or unless active tree preservation is done to mitigate root loss from construction.

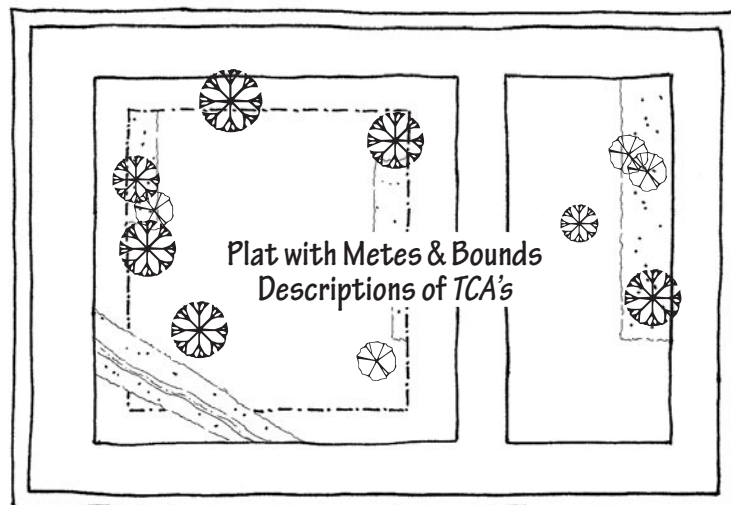


e) Documentation of Tree Conservation Areas—Before a Grading Permit Will Be Issued.

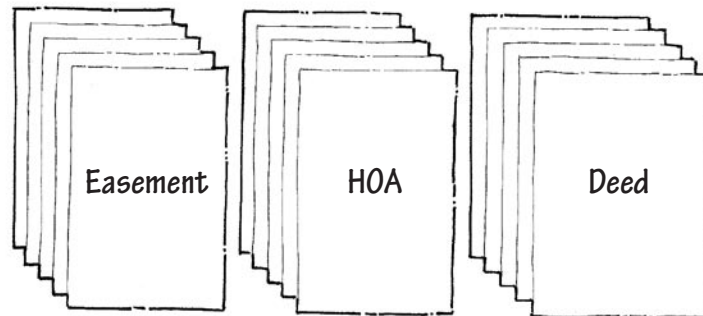
After the *TCAs* have been determined, and prior to any tree disturbing activity, the developer must submit a map with metes and bounds descriptions of all *TCAs* to the *City Forestry Specialist* for approval. The developer must install tree protection fence around all *TCAs*, and the tree protection fence must be inspected by the *City Forestry Specialist*. A grading permit will not be issued until these requirements are met.

Before a building permit will be issued or a subdivision plat will be authorized for recording: After the metes and bounds map of *Tree Conservation Areas* has been approved, and prior to or concurrent with subdividing the property, and prior to issuing a building permit [whichever occurs first]; landowners must record the following with the register of deeds, and provide copies or proof of recordation to the *City Forestry Specialist*.

- (1) A plat with metes and bounds descriptions of all *TCAs*.



- (2) An easement that allows all future lot owners [and their agents] to perform *active tree preservation* & replant trees.
 - (3) An owner's Association declaration in conformity with Raleigh City Code 10-3072, and Chapter 47F of the General Statutes, for maintenance & protection of trees in *TCAs*.
 - (4) One or more deeds must be recorded that conveys all *TCAs* to the homeowner's association in fee or in easement.
- (TC-7-04 Section 16)



(f) Permitted *Tree Disturbing Activities* Within Designated Tree Conservation Areas:

Tree disturbing activities are allowed in designated *TCAs* only with a Tree Conservation Permit. Prior to any *tree disturbing activity*, a Tree Conservation Permit must be obtained from the *City Forestry Specialist* in the Inspections Department, and tree protection fence must be installed along the boundary of the *tree disturbing activity* and inspected by the *City Forestry Specialist*. {City Code 10-2082.14 (f)(3)d.} All *tree disturbing activities* shall be in conformity with the following requirements:

- (1) Within the primary *TCAs* of Resource Management Districts, and areas with slopes of 45% or greater adjacent to or within floodways, the permittee must meet these provisions of 10-2082.12 (c) –(e).**

10-2082.12(c)-(e): A tree conservation permit is required to perform grading, tree removal, or any other *tree disturbing activity* in Resource Management *TCAs*. The permittee cannot grade more than 30% of the *TCA* area. A permit is required to remove trees: that are certified unsafe or unhealthy, for driveway installation, to eliminate vision obstructions, for government easements, for storm drainage devices, to install a berm in single family areas, to install public improvements, & for wooded area cleanup. Wooded area cleanup allows removal of shade trees <=5" caliper, and understory trees <=2" cal. With a report to explain why grading/tree removal not allowed by 10-2082.12(1-3) is needed, a tree conservation permit may be issued to remove trees in Resource Management *TCAs*; in this instance the permittee must provide a tree replacement plan to replant one 3" caliper tree per 100 sq ft of disturbed area, or establish a new natural area.
- (2) Within *TCA Zone 2 of Neuse River Riparian Buffers*, permitted *Tree disturbing activities* are allowed for the following:**
 - a. For work ancillary (that is a part of, or supports) to that allowed by *DWQ* in Zone 1. Example: extension of a roadway perpendicular to Zone 1 and Zone 2 is allowed if approved by *DWQ* in Zone 1.
 - b. For installation of a sanitary sewer when any part of an existing permanent structure which is to remain on site is within the width of the permanent sewer easement and the temporary construction easement plus ten feet.
 - c. For installation of a sanitary sewer when 50% or more of a reach of sanitary sewer main will be over 12 feet deep.
- (3) Within secondary *TCAs*, the following requirements must be met before any *Tree Disturbing Activities* are permitted:**
 - a. A Tree Conservation Permit must be obtained from the Inspections Department.

The following types of tree disturbing activities are allowed with a permit in Secondary *TCAs*:

- 1. To remove certified unsafe & *unhealthy* trees (Certification to be done by a *Certified Arborist*, N.C. Registered Forester, or N.C. Landscape Architect). Dead trees can be removed without certification if the owner can show that the tree died of natural causes, and if the dead tree is replaced. A photo with a brief explanation of the dead tree will suffice.
- 2. To remove a tree that is causing a vision obstruction in a sight triangle as defined by NCDOT's manual:

“Policy On Street And Driveway Access To North Carolina’s Highways.”

3. To install public improvements required by Part 10, Ch 3 of the CityCode, including but not limited to, street construction.

(TC-7-04 Section 16)

4. To clean up wooded areas provided they meet street protective yard or transitional protective yard requirements after the cleanup is completed. Permitted tree removal includes: shade trees less than 2” *dbh* and understory trees less than 1” *dbh*. The permittee must submit a plan with the permit application which provides a description of the work, and how it will be done without damaging the remaining trees or compacting the soil. Tree replacement is not required for wooded area cleanup.

If *tree disturbing activities* occur inside a *TCA* under a Tree Conservation Permit, the *CRZs* of other trees 10” *dbh* and larger in that same *TCA* cannot be disturbed. (i.e. The work must be done without using heavy equipment, or other soil-disturbing equipment or techniques, in the *TCA*. {City Code 10-2082.14 (f)(3)c.}

A tree replacement plan must be submitted with the permit application and approved by the Inspections Department before a Tree Conservation Permit will be issued to remove trees in Secondary *TCAs*.

b. Tree replacement is required whenever a Tree Conservation Permit is issued to perform a *tree disturbing activity* on any tree(s) within Secondary *TCAs*. Tree replacement shall be done in one of two ways: either by preserving alternate undisturbed *TCAs*, or by replanting alternate areas as described below.

– For secondary *TCAs* (2)a. and (2)b. (50’ thoroughfare buffers):

Option 1 is to preserve alternate, undisturbed *TCAs* equal to the size of the disturbed area(s) with similar size & density tree cover between the street protective yard & the principal building. The requirements of b. through d. herein must also be met.

Option 2 is to plant replacement trees between the street protective yard & the principal building at a rate of 2” caliper for each 100 square feet of disturbed area.

– For secondary *TCAs* (2)c. and (2)d. (65’ & 32’ perimeter buffers):

Option 1 is to preserve alternate, undisturbed *TCAs*; equal to the size of the disturbed area(s) with similar size & density tree cover, anywhere on site. The requirements of b. through d. herein must also be met.

Option 2 is to plant replacement trees anywhere on site at a rate of 2” caliper for each 100 square feet of disturbed area.

All substituted natural areas and new-planted areas shall be designated as *TCAs* on plats with metes & bounds descriptions and recorded at the local county register of deeds. The size of all tree replacement areas shall be calculated based on the *CRZs* of disturbed trees, and shall have a minimum dimension of 20’. To meet the 2” caliper/100 square feet requirement along thoroughfares, a minimum of one 2” caliper tree will be required. For tree replacement in the 65’ and 32’ perimeter buffers, either one 2” caliper tree, or two 1” caliper trees can be planted.

(g) Alternate Means of Compliance:

If an alternate means of compliance is desired, the conditions required by 10-2082.4(a) must be examined, which states that alternate compliance for Tree Conservation different from what is prescribed by this Code may be allowed in cases where a stream, natural rock formation, or other physiographic conditions exist.

Types of alternate compliance that must be considered before opting to request a “buyout” are: reduction of tree *critical root zone*, using accepted arboricultural practices and practices described in active tree preservation, or alternate construction methods to minimize impact to tree roots, or any other practices that will be effective at preserving existing trees.

Alternate compliance must be approved in writing by the Department authorized to approve the original plan. The Department will require proof to substantiate a claim of need for alternate compliance. The Department will also require proof that alternative options to preserve existing trees are not feasible before considering payments as an alternative means of compliance. Removing trees and replanting will not be considered as an alternative method of compliance. (TC-7-04 Section 10 & Section 16)

If payment as an alternate means of compliance is approved, a landowner may satisfy the tree preservation

requirements of 10-2082.14 by paying to the City the tax value of the land (does not include the value of structures) removed from compliance. This value will be determined as a ratio of the entire land value, based on current tax value per square foot.

(h) Penalties: A violation of 10-2082.14 subjects the offender to: a \$1000 civil penalty for the first illegally removed or disturbed tree, plus 35¢ per square foot of illegally, tree-disturbed area. For illegal tree removal, the *Critical Root Zone* of a removed tree will be used to calculate the size of the disturbed area to determine the penalty.

(i) Restoration of trees removed or disturbed: In addition to the civil penalty above, the owner of the property must replant as described below.

- When trees in a *TCA* are illegally removed, or if they are irreparably damaged, the owner of the real property must remove & replace the disturbed tree(s) with tree(s) of equal *caliper*. (i.e. If a 12" dbh tree is removed or irreparably damaged, 12 *caliper* inches of new trees must be replanted—example: four 3" *caliper* trees.)
- The *City Forestry Specialist* must approve a tree replanting & maintenance plan before replanting.
- Replacement trees must be 2" *caliper* or larger.
- Replanting cannot be done in a wooded area with a *basal area* of 80 or more.
- All replacement trees must be replanted in a planting area of at least 350 square feet, with a minimum dimension of 7 feet.
- Replacement trees must be planted within the same *TCA* where the violation occurred if there is enough land area on which to replant.
- If there is not enough area to replant in the disturbed *TCA*, the owner must replant another area on the property & establish it as a *TCA*.
- If there is not enough area to replant in the disturbed *TCA*, and no where else on the property to replant, then a replacement fee of \$100 per *caliper* inch of replacement trees must be paid to City.

(TC-7-04 Section 16) END OF SECTION 10-2082.14



26 Miscellaneous Related Amendments

30% lot coverage limit on landscaping required by the Landscape Ordinance: Section 10-2082.4(b)—Landscaping Alternate Means of Compliance—was amended to include tree conservation areas in calculation of the maximum amount of a site that can be required for landscaping and tree conservation—the maximum amount remains at 30%. When the 30% maximum is reached, required TCAs cannot be reduced by more than half. (TC-7-04 Section 11)

Transition protection yards and perimeter buffer Tree Conservation Areas:

City Code 10-2082.4(b) was further amended to require the following: Transition protection yards must be combined with perimeter buffer TCAs in order to count the perimeter buffer toward the 30% maximum required by the Landscape Ordinance. The 65' or 32' perimeter buffer TCA (or its alternate compliance area) cannot count toward the 30% limit if the owner chooses to place it at a different location on a site when it can be combined or overlapped with a required Transition Protective Yard. (TC-7-04 Section 11)

City Code 10-2082.9—Transitional Protective Yards—(b)(3) was amended to define vacant property as being “at the time of application for development.” (TC-7-04 Section 12)

10-2082.9—Transitional Protective Yards—(g)(1) was amended to add a new last subsection e. that requires use of a closed fence or wall to meet transition protective yard regulations if: “e. The ground area required for all landscaping by this code exceeds 30% of the land area.” (TC-7-04 Section 13)

City Code 10-2082.9—Transitional Protective Yards—(g)(3) was amended to add a new last subsection d. that allows the width of transitional protective yards to be “reduced in size” (more than half, but not less than 10' wide) with the use of a closed fence or wall if; the TPY screens a low or medium impact use, *Conservation Management* property, or residential development with congregate care or congregate living structures in a residential zoning district; so that the ground area required for all landscaping by this code doesn't exceed 30%. (TC-7-04 Section 14)

Tree conservation permits are required for tree disturbing activities in Resource Management (RM) Districts: City Code 10-2082.12—Landscape Requirements for Resource Management Districts—was amended as follows.

A Tree Conservation Permit is required for any *tree disturbing activity* in all RM zoning districts for any size lot.

Where replanting is required, the *City Forestry Specialist* shall first approve a replacement planting and maintenance plan. (TC-7-04 Section 15)

Tree Conservation Area Requirement Is 10% For Group Housing Projects: City Code Section 10-2103(d)—Group Housing Development—Open Space/Natural Areas—was amended as follows: subsections 10-2103(d)(1)-(d)(3) that existed prior to May 1, 2005; pertaining to tree preservation and planting requirements for group housing, multifamily developments, and cluster unit developments; were repealed.

These requirements were replaced by the 10% Tree Conservation Area requirement of 10-2082.14. (TC-7-04 Section 17)

New requirements for review of non-residential site plans by Planning Commission: City Code Section 10-2132.2(c)(1) was amended to repeal and rewrite subsections j. and k. to require Planning Commission approval of site plans that do not provide the following for:

j. Nonresidential site plans for parcels less than two acres in size, with a *basal area* of 30 or more that is located adjacent to or within 50' of a thoroughfare, must provide:

1. A uniform 50' wide *natural protective yard* along the thoroughfare, or,
2. A 50' average *natural protective yard* (variable width 0' – 100'). A tree survey must be provided that proves that the number of trees ≥ 5 " dbh in the average 50' natural protective yard is the same as that in the uniform 50' natural protective yard, or,
3. Identify and establish a TCA along the thoroughfare as required in 10-2082.14.

k. Nonresidential site plans for parcels less than two acres in size, located within the 50' buffer area adjacent to any riparian area, that fail to provide a 50' wide natural protective yard in the buffer.

Planning Commission review of site plans is not required for developments along thoroughfares with basal areas of less than 30 square feet. (TC-7-04 Section 18)

Tree conservation permit is required: City Code 10-6032—Permits Required—was amended to add Tree Conservation Permit as a required permit. This provisions reads:

“(I) **Tree conservation permit.**

No *person shall* undertake any *tree disturbing activity*, as that term is defined in Part 10 chapter 2, without first obtaining a tree conservation permit from the Inspections Department whenever this Code, or condition of approval of any site plan, subdivision plan or variance, or conditional use zoning ordinance requires that *person* or landowner to either protect and conserve trees or to install protective fencing.”.

(TC-7-04 Section 23)

Application for Permits: City Code 10-6033—Application For Required Permits—was amended to add the application for a Tree Conservation Permit. Written application must be made for the Tree Conservation Permit. The application for a tree conservation permit shall contain all drawings, data, distances, tree DBH sizes, boundary limits of all tree disturbing activities and all tree conservation areas and any other information required to ensure compliance with the provisions of this Code, conditions of approval of any site plan, subdivision plan or variance or provisions of any applicable conditional use zoning ordinance. (TC-7-04 Section 24)

Permits cannot be issued until tree protection fence is erected: City Code 10-6035(f)—Limitations On Issuance of Permits—was amended to add Section 10-2082.14—Establishment and Protection of Tree Conservations Areas—to the conditions that no permit shall be issued until the tree protection limits of 10-2082.14, in addition to other tree save areas (i.e. natural resource buffer yards, open space, etc) are marked by a protection fence in the field. (TC-7-04 Section 25)

Tree Conservation Permit Fee: City Code 10-6039—Permit Fees—was amended so that the fee for a Tree Conservation Permit is \$100. (TC-7-04 Section 27)

This ordinance became effective on May 1, 2005. (TC-7-04 Section 33)

Development plans submitted prior to May 1, 2005 are exempt: Development plans submitted prior to May 1, 2005 are not subject to TC-7-04. This exemption does not apply to *future tree disturbing activities*, site plans, or further subdivisions of the site. All planned unit developments approved prior to January 4, 2005 which contain tree conservation requirements that total at least 10% of the entire planned unit development are exempted from this ordinance until May 1, 2009. (TC-7-04 Section 33)



28 Appendix 1: Basal Area

Basal area is a measure of tree density used by foresters. It measures the total cross sectional area of tree trunks at 4.5' above grade in square feet/acre in a wooded area. *Basal area* is also correlated to various measures of forest stand health such as tree density, leaf area index, and root area index.

Basal area measurement is not required for any Primary *Tree Conservation Areas*.

Basal area measurement is required for Secondary *TCAs*. (a) – (d). *Basal area* calculations are not required for Secondary *TCAs* (e) – (f) for individual trees.

Measurement of *Basal area* in Secondary *TCAs*:

Basal area must be calculated from tree *dbh* measurements using the formula to calculate *BA* per tree: $0.005454 \times dbh^2$, then summing the *BA* of the individual trees of the area being evaluated. The area in which the trees are located must be converted to acres.

Example 1 (See Figure 16): The calculations for a 50' length of buffer yard, 50' wide; containing one 10" *dbh* tree, one 11" *dbh*, & one 12" *dbh* tree; are as follows.

Step 1: Calculate acreage: $50'W \times 50'L = 2500 \text{ sq ft}$
 $2500 \text{ sq ft} / 43560 \text{ sq ft/ac} = 0.0574 \text{ acres}$.

Step 2: Calculate *BA* for each tree & total:

$BA / \text{tree} = 0.005454 \times dbh^2$

$BA_{10"} = 0.5454 \text{ sq ft} + BA_{11"} = 0.6599 \text{ sq ft} + BA_{12"} = 0.7854 \text{ sq ft}$
= total of 1.9907 sq ft for all 3 trees.

Step 3: Calculate *BA* per acre:

$BA = 1.9907 \text{ sq ft} / 0.0574 \text{ acre} = 35$

In this example, *basal area* is calculated for each individual tree, and it meets the minimum requirement of 30 provided the *CRZs* of all three trees are completely inside the buffer boundaries.

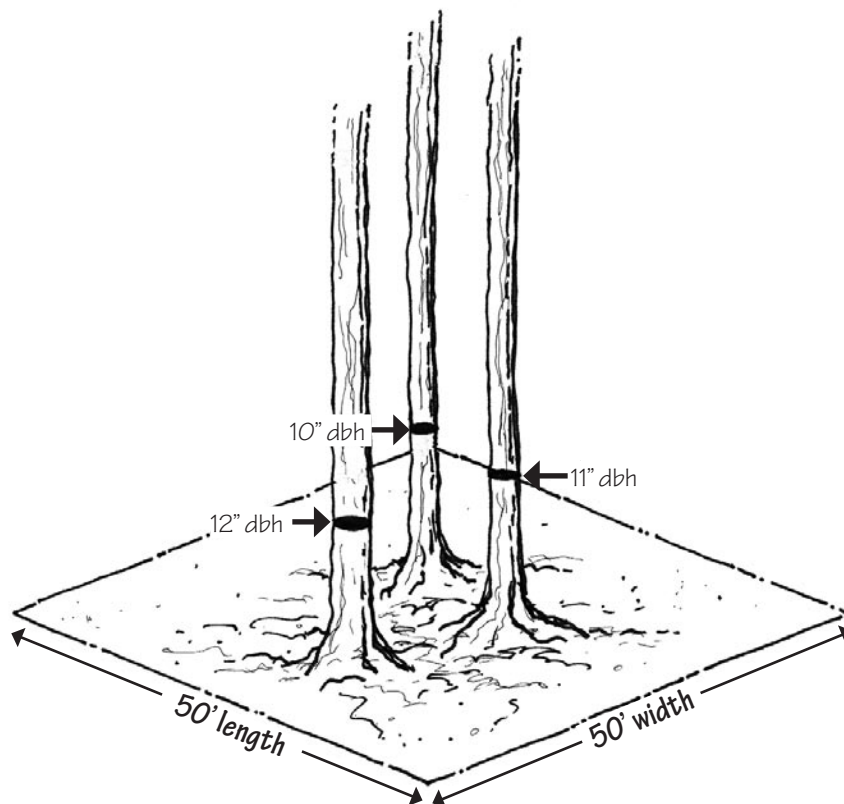


Figure 16. *Basal area* calculated directly from tree *dbh* in a 50' long X 50' segment of *TCA* yard. See calculations.

Tables 1 and 2 below show the minimum number of trees required (by average *dbh* class) in a 50' long segment of buffer for different buffer widths, to yield the minimum required *basal area* of 30. Actual *basal area* may be more than 30 due to rounding up of numbers because fractions of trees cannot be counted. The top row of numbers are tree diameters at 4.5' above grade (*dbh*). The bottom row of numbers are Critical Root Zone radii. Table 1 is for trees 3" *dbh* to 26" *dbh*. Table 2 is for trees 27" *dbh* to 50" *dbh*. All the numbers in column 2—Area (sq ft)—are calculated by multiplying 50' length of buffer by column 1—Buffer Width. Three examples are below and are shaded in the tables.

Example 1: Within a 50' L X 70' W segment of buffer, with average *dbh* of 10"; it takes 5 trees to equal a *basal area* of 30. Remember that the *CRZs* of any trees 10" *dbh* and larger must be completely inside the *TCA* boundary in order to count toward the *basal area* requirement.

Example 2: Within a 50' L X 50' W segment of buffer, there are no trees 10" *dbh* and larger. Average *dbh* is 7". Using Table 1, we see that it takes seven trees to yield a *basal area* of 30.

Example 3: Within a 50' L X 32' W buffer, we have one tree that is 20" *dbh*. Using the table, coming across from 32' buffer width, where it intersects with 20" *dbh*, we find a value of NA, which means that the buffer width, if left at 32' wide, is not wide enough to protect the *CRZ*. The *CRZ* radius can be used to calculate how much the buffer would need to be widened to preserve the 20" *dbh* tree.



¹ Number of trees, by dbh class, per 50 linear feet of buffer X Buffer width, to yield a basal area of 30 sq ft per acre.

Table 1, Part 1:

Buffer Width (ft)	Area (sq ft)	# of acres	Average Tree dbh																									
			3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
20	1000	0.023	15	8	6	4	3	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
30	1500	0.0344	22	12	8	6	4	3	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
32	1600	0.0367	23	13	9	6	5	4	3	3	2	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
40	2000	0.0459	29	16	11	8	6	4	4	3	3	2	2	2	2	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
50	2500	0.0574	36	20	13	9	7	5	4	4	3	3	2	2	2	2	2	1	1	1	NA	NA	NA	NA	NA	NA	NA	NA
60	3000	0.0689	43	24	16	11	9	6	5	4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	NA	NA	NA	NA
65	3250	0.0746	46	26	17	12	10	7	6	5	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	1
70	3500	0.0803	50	28	18	13	11	7	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1
80	4000	0.0918	57	32	21	15	10	8	7	6	5	4	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1
100	5000	0.1148	71	40	26	18	13	10	8	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1
² CRZ Radius (ft):			4	5	6	8	9	10	11	13	14	15	16	18	19	20	21	23	24	25	26	28	29	30	31	33	35	37

Example 3

Example 2

Example 1

Table 1, Part 2:

Buffer Width (ft)	Area (sq ft)	# of acres	Average Tree dbh																									
			27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
20	1000	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
30	1500	0.0344	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
32	1600	0.0367	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
40	2000	0.0459	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
50	2500	0.0574	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
60	3000	0.0689	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
65	3250	0.0746	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
70	3500	0.0803	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
80	4000	0.0918	1	1	1	1	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
100	5000	0.1148	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
² CRZ Radius (ft):			34	35	36	38	39	40	41	43	44	45	46	48	49	50	51	53	54	55	56	58	59	60	61	63	65	67

¹ NA: means that the buffer width is not wide enough to protect all of the Critical Root Zone.

² Critical Root Zone Radius: Equals 1.25' undisturbed radius

This table is an

All submitted plans must contain a Tree Conservation Plan if compliance with TC-7-04 is required (i.e. All lots 2 acres or larger in size with wooded cover and/or scattered trees on the property; OR non-residential lots less than 2 acres with wooded areas adjacent to a thoroughfare or with riparian buffers on the property).

- (1) Sheet 1: Provide a Tree Conservation Map with metes and bounds descriptions of all required and proposed tree conservation areas. Tree Conservation Area boundaries must be shown as dashed lines.
- (2) Use the “Standardized Names For Tree Conservation Areas” to name or designate all Tree Conservation Areas (TCAs).
- (3) Sheet(s) 2+: Show the *Tree Conservation Areas* (TCA) and grading plan together with: tree protection fence, and silt/tree fence locations.
- (4) Only For secondary *Tree Conservation Areas*, the following items must also be provided:
 - 1) Sheet X: Photo panoramic panel of proposed secondary TCAs a. – d. Each photo must represent 50 linear feet of tree conservation area. Two copies.
 - 2) Certified tree cover report with descriptions of each 50 linear feet of TCA. Report must be done by N.C. Registered Forester, ISA Certified Arborist, or N.C. Licensed Landscape Architect. Two copies.
 - 3) Reports and photo panel must be inter-related.
 - 4) Most recent aerial photo. Two copies.
 - 5) In lieu of the requirements for photo panoramic panels and the most recent aerial photograph, a tree survey may be submitted with calculations of basal area. The tree cover report every 50 linear feet is still required.
- (5) Provide Tree Conservation Data Sheet.
- (6) Show acreage calculations in same order as listed on Tree Conservation Data Sheet.
- (7) If clearing, removing, or harvesting trees on parcels 2 acres & larger in size; unrelated to development of a site, or for a grading permit without an approved site development plan; or without established Tree Conservation Areas; Sheet 1 will be a Tree Conservation Plan that shows all required protected buffers with tree protection fence, and all grading changes.



32 Appendix 3: Standardized Names To Use When Designating Tree Conservation Areas

Use the standardized names below to designate tree conservation areas and protected buffers on all tree conservation plans.

1) Primary Tree Conservation Areas—Names To Be Used In Plans And Legally Recorded:

- a. Major Primary Tree Conservation Areas—Names To Be Used In Plans And Legally Recorded:
 - Primary Tree Conservation Area X' Wide—SHOD X Yard
[example: Primary Tree Conservation Area—25' Wide SHOD 2 Yard]
 - Primary Tree Conservation Area—X' TD Yard
[example: Primary Tree Conservation Area—90' Wide TD Yard]
 - Primary Tree Conservation Area—MPOD
 - Primary Tree Conservation Area—50'-Wide Natural Protective Yard—CUD Z-XX-2005
 - Primary Tree Conservation Area—50'-Wide Natural Protective Yard (Z-XX-2005 = zoning case #)
- b. Primary Tree Conservation Area X" dbh Champion Tree, species name, & Critical Root Zone
- c. Primary Tree Conservation Area—20'-Wide Neuse Riparian Buffer Zone 2
- d. Primary Tree Conservation Area—45% Slopes

2) Secondary Tree Conservation Areas—Names To Be Used In Plans And Legally Recorded:

X' Wide Greenway Tree Conservation Area

[example: 75' Wide Greenway Tree Conservation Area]

- a. Secondary Tree Conservation Area—50' Wide Major Thoroughfare Yard
- b. Secondary Tree Conservation Area—50' Wide Minor Thoroughfare Yard
- c. Secondary Tree Conservation Area—65' Wide Perimeter Yard
 - Alternate Compliance Secondary Tree Conservation Area—65' Perimeter Yard
- d. Secondary Tree Conservation Area—32' Wide Perimeter Yard
 - Alternate Compliance Secondary Tree Conservation Area—32' Perimeter Yard
- e. Secondary Tree Conservation Area—X" dbh Tree Within 65' Non-Vacant Property (X >= 10" dbh)
[example: Secondary Tree Conservation Area—14" dbh Tree & Critical Root Zone Within 65' Non-Vacant Property]
- f. Secondary Tree Conservation Area—X" dbh Tree Within 32' Vacant Property (X >= 10" dbh)
[example: Secondary Tree Conservation Area—14" dbh Tree Within 32' Vacant Property]

3) Protected Buffers: Use in situations in which trees will be cleared or harvested, but there is no approved site plan or subdivision plan.

X' Wide Greenway Tree Conservation Area

[example: 75' Wide Greenway Tree Conservation Area]

- a. 50' Wide Thoroughfare Buffer (for major & minor thoroughfares)
- b. 65' Wide Perimeter Roadway buffer (for roadways other than major thoroughfares)
- c. 65' Wide Perimeter Buffer—Adjacent To Non-Vacant Property
- d. 32' Wide Perimeter Buffer—Adjacent To Vacant Property

Appendix 4: Tree Conservation Plan Data Sheet

(Refer To Ordinance TC-7-04 And User's Manual For Instructions)

Project Name: _____ Total Site Acres: _____

	# Acres	% of Tract
(1) Primary Tree Conservation Areas		
(a1) SHOD 1 Yards	_____	_____
(a2) SHOD 2 Yards	_____	_____
(a3) SHOD 3 Yards	_____	_____
(a4) SHOD 4 Yards	_____	_____
(a5) Thoroughfare District Yards	_____	_____
(a6) Conservation Management District	_____	_____
(a7) Metro Park Overlay District	_____	_____
(a8) Conditional Use Zoning Tree Save Areas	_____	_____
a9) Natural Protective Yards Required By Re-zoning Or Other conditions	_____	_____
(a10) Other Required Tree Save Areas	_____	_____
(b) Champion Trees including their Critical Root Zones	_____	_____
(c) Zone 2 of Neuse riparian buffers	_____	_____
(d) Areas with slopes of 45% or more adjacent to or within floodways	_____	_____
Subtotal of Primary Tree Conservation Areas:		_____
Greenway Easement: (voluntarily inclusion of a portion of greenway)		_____
(2) Secondary Tree Conservation Areas		
(a) Major Thoroughfare: 50-foot Average Buffer	_____	_____
(b) Minor Thoroughfare: 50-foot Average Buffer	_____	_____
(c) 65-foot perimeter yard adjacent to non-vacant property	_____	_____
(c) Alternate compliance area: 65-foot perimeter yard	_____	_____
(d) 32-foot perimeter yard adjacent to vacant property	_____	_____
(d) Alternate compliance area: 32-foot perimeter yard	_____	_____
(e) Individual trees 10" dbh & larger within 65' of roadways or any non-vacant property	_____	_____
(f) Individual trees 10" dbh & larger within 32' of any vacant property	_____	_____
Subtotal of Secondary Tree Conservation Areas:		_____
TOTAL ALL TREE CONSERVATION AREAS:		_____

34 Appendix 5: Champion Tree Locations

State Champions: Location information is not available at the time of this printing. The list of State Champion Trees is maintained by the North Carolina Division Of Forest Resources.

Capital Trees: The list of Capital Tree locations is maintained by the Wake County Keep America Beautiful Program. They are provided in this publication as a reference. This ordinance provides protection to all trees on the lists below.

Capital Tree Awards 1996 — *Raleigh trees*

Champion 1996

Common Name	Botanical Name	Location
Water Oak	<i>Quercus niger</i>	1707 Patton Rd.
White Ash	<i>Fraxinus americana</i>	518 Elm St.

Histroical 1996

Common Name	Botanical Name	Location
Black Oak	<i>Quercus velutina</i>	213 Oberlin Rd.
Pecan	<i>Carya illinoensis</i>	4028 Carya Dr.
Pecan	<i>Carya illinoensis</i>	547 E. Jones St.
Pecan	<i>Carya illinoensis</i>	213 Oberlin Rd.
Saucer Magnolia	<i>Magnolia soulangeana</i>	213 Oberlin Rd.
Southern Magnolia	<i>Magnolia grandiflora</i>	503 Jones St.
White Oak	<i>Quercus alba</i>	1108 Glenwood Ave.
White Oak	<i>Quercus alba</i>	3715 Lassiter Mill Rd.
White Oak	<i>Quercus alba</i>	Longview Gardens

Capital Tree Awards 1998 — *Raleigh trees***Champion 1998**

Common Name	Botanical Name	Location
Chinese Chestnut	Castanea mollissima	Sertoma Park
Eastern Cottonwood	Populus deltoides	Richland Ck. @ Ebenezer Ch. Rd.
Pond Cypress, Coast Redwoods	Taxodium ascendens, Sequoia sempervirens	107 Montgomery St., Raleigh
Hybrid Elm	Ulmus x sp.	612 Wade Avenue
White Oak	Quercus alba	2217 St. Mary's St
Black Oak	Quercus velutina	2709 Gordon St
Japanese Crepe Myrtle	Lagerstroemia fauriei	J.C. Raulston Arboretum at NCSU
Burford Holly	Ilex cornutaburfordii	Shaw University
White Ash	Fraxinus americana	518 Elm St., Raleigh

Champion/Historical 1998

Common Name	Botanical Name	Location
Japanese Weeping Cherry	Prunus subhirtella pendula	Oakwood Cemetery
Willow Oak	Quercus phellos	Nash Square

Historical 1998

Common Name	Botanical Name	Location
Ginkgo	Ginkgo biloba	Shaw University
Linden	Tilia americana	Oakwood Cemetery
White Oak	Quercus alba	2822 Van Dyke Ave.

Landmark/Historical 1998

Common Name	Botanical Name	Location
Mixed Oaks	Quercus alba., Quercus phellos, Quercus falcata	Dorothea Dix Hospital
White Oak	Quercus alba	in front of Young Hse. Dix Hospital
Mixed Oaks, Ash Mix, Ginkgo	Quercus sp., Fraxinus sp., Ginkgo biloba	St. Augustine's College

Capital Tree Awards 2000 — *Raleigh trees*

Champion 2000

Common Name	Botanical Name	Location of Tree(s)
Loblolly Pine	<i>Pinus taeda</i>	6101 Heatherstone Dr.
Japanese Maple	<i>Acer palmatum</i>	1932 Ridge Rd., Raleigh
Southern Red Oak	<i>Quercus falcata</i>	204 W Whitaker Mill Rd.
Sassafras	<i>Sassafras albidum</i>	Mt. Hope Cemetery, Raleigh
Incense-cedar	<i>Libocedrus decurrens</i>	301 Pogue St., Raleigh
Willow Oak	<i>Quercus phellos</i>	Wiley Elementary School, Raleigh
Autumn Flowering Cherry	<i>P. subhirtella</i> var. <i>autumnalis</i>	Raleigh Woman's Club
Chinese Wingnut	<i>Pterocarya stenoptera</i>	JC Raulston Arboretum, Raleigh
Eastern Red Cedar	<i>Juniperus virginiana</i>	1540 Caswell St., Raleigh
Hybrid Oak	<i>Quercus michauxii</i> X <i>alba</i>	Raleigh Rose Garden
White Ash	<i>Fraxinus americana</i>	916 Cowper Drive

Histoical 2000

Common Name	Botanical Name	Location of Tree(s)
Southern Red Oak	<i>Quercus falcata</i>	Emmanuel Baptist Church, Raleigh
Water Oak	<i>Quercus nigra</i>	St. Joseph Catholic Church, Raleigh
White Oak	<i>Quercus alba</i>	325 Polk St., Raleigh
White Oaks	<i>Quercus alba</i>	1013 Falls Bridge Dr., Lot 18, Raleigh
Willow Oak	<i>Quercus phellos</i>	904 Dorothea Dr., Raleigh
White Oak	<i>Quercus alba</i>	NCSU Schenck Memorial Forest
Pecan	<i>Carya illinoensis</i>	Nash Square, Raleigh
Willow Oak	<i>Quercus phellos</i>	8008 Old Stage Rd.
Black Walnut	<i>Juglans nigra</i>	Walnut Terrace Neighborhood

Landmark 2000

Common Name	Botanical Name	Location of Tree(s)
Yoshino Cherries	Prunus X yedoensis	Montlawn Memorial Park, Raleigh
Swamp Chestnut Oaks	Quercus michauxii	Moore Square, Raleigh
Chinese Fir/Japanese Cedar	Cunninghamia lanceolata/ Cryptomeria japonica	102 Cowper St, Raleigh
Willow Oak, Deodar Cedar	Quercus phellos, Cedrus deodara	2704 Vanderbilt Dr., Raleigh
Willow Oaks	Quercus phellos	Chavis Heights Complex, Raleigh

Capital Trees Program 2002 Raleigh trees

Category	Species	Botanical Name	Address
Champion	Japanese Maple	Acer Palmatum	P.O. Box 41914, S. side of Hermann Student Center
	American Elm	Ulmus Americana	P.O. Box 41914, S. side of Hermann Student Center
	White Oak	Quercus alba	8368 Greywinds Dr. Ralrigh 27615
	Chinese Evergreen Oak	Quercus Myrsinifolia	Hillsborough St. Raleigh 27607
	Oglethorpe Oak	Quercus Oglethorpensis	PO Box 7609 NCSU Raleigh 27695
	Columnar English Oak	Quercus Robur 'fastigiata'	PO Box 7609 NCSU Raleigh 27695
Champion/ Historical	Pecan	Carya Illinoensis	5801 Falls of the Neuse Rd Raleigh 27609
	White Oak	Quercus alba	4808 Connell Dr Raleigh 27612
Historical	White Oak	Quercus alba	1818 Midwood Dr Raleigh 27604
	White Oak	Quercus alba	1818 Midwood Dr Raleigh 27604
	White Oak	Quercus Marilandica	6705 Walnut Cove Dr. Raleigh 27603
	Blackjack Oak	Maclura Pomifera	723 St. Mary's Street 27605
	Osage Orange	Maclura Pomifera	Mordecai Historic Park - PO Box 28072, Ral 27611
	American Beach	Fagus Grandifolia	4028 Carya Dr. Raleigh 27610
	American Elm	Ulmus Americana	208 Harrington (2nd lot N of Jones St)
	Osage Orange	Maclura Pomifera	South Bend of W. Park Dr. (block to Hillsborough)
Landmark	Red / White Oaks	Quercus alba / rubra	Wade Avenue Raleigh 27607
	American Beech	Fagus Grandifolia	4808 Connell Dr Raleigh 27612
Landmark/ Historical	Pecan	Carya Illinoensis	104 Montgomery St Raleigh 27607